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ABSTRACT

This guide addresses the role of online searching in school library media centers. The first section reviews the literature in the area and presents guidelines for planning and implementing online access for students based on the experiences reported. This section lists 44 references. The second section summarizes the results of a 1986 survey of online providers in the schools which examined four basic questions: (1) who is searching in the schools; (2) what the policies are regarding online in the schools; (3) systems, databases, hardware, and software used in the schools; and (4) the demographics of online search providers. The third section summarizes the findings of the survey, and an annotated bibliography of materials on the topic published in the 1980's is presented in the fourth section. A total of 41 items are grouped in the following categories: Introductions to the Topic; Recent Texts and Instructional Guides; Recent Articles about Online Searching in the Schools; Accounts of Practice by School Media Specialists; and Management of Online Information Services. Journals that publish articles on online searching in the schools and bibliographies covering the topic are also listed in this section. Lists of selected document delivery services and vendor contacts for school media specialists are appended. The second edition differs from the first in that the review of the literature has been recast in the form of guidelines for planning and implementation, and both the review of the literature and the annotated bibliography have been updated through spring 1989. (MES)

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second edition

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2

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INTRODUCTION

This guide addresses the role of online searching in school library media centers as it has been reported in the literature, and suggests guidelines for planning and implementing online services based on reports of actual experiences at the secondary level; this search mode is as yet rarely reported in middle and elementary schools. Although the capability to search electronically for information stored in a remote host computer has been available for nearly 20 years, it is only since 1980 that real movement to adopt this innovation for students has moved into schools below the college level, and only in the last few years that online services have actually been implemented.

Online usage reported in schools has been mainly bibliographic in nature, meaning that computers have been used to do literature searching via access to bibliographic databases. These databases contain files of document descriptions (i.e., descriptions of information sources in any format) and include such access points as author, title, source, document type, date of publication, language of publication, abstract of content, and descriptive subject terms. The online process is one in which a searcher employs a set of commands to direct the computer to search machine-readable indexes for the desired information or references to materials that contain it.

This discourse looks at what is still a relatively undefined and emerging growth area in providing information services in schools. Attention is directed to areas of concern reported by pioneer practitioners and by those who have studied them. The focus is on online access for students rather than on how increased service is provided to teachers and school administrators.

Readers should note that recent technological advances—notably CD-ROM (compact disk-read only memory)—are rapidly changing modes of information storage. The ability to store vast quantities of information (i.e., virtually millions of document records) on a single laser disk—a disk that can be acquired and accessed in-house—will certainly cause changes in the configuration of online services in the near future. Configurations for information access in the

school environment may soon include in-house use of databases on disks for the most heavily used information, with network access from library media centers to district level or professional collections, compact disks for less frequently needed information, and online access to search services for the very recent and/or rarely needed information sources. For example, a building-level library media center might own ERIC on CD-ROM and use a search service only for the latest updates, while disks of a highly technical database might be shared among schools in an administrative district, with online access to the vendor available locally for the most recent database records. Hence, students will need to learn about not only print and online sources, but other modes of information access as well.

The review that follows does not attempt to cover or suggest an exhaustive list of readings. The goals are threefold: first, to provide readers with guidelines for planning and implementing online access on information services and instruction for students based on the experiences reported in the literature; second, to look at a survey that we believe shows what was happening in 1986; and third, to offer a location guide to materials readers should consider pursuing for additional information.

While some information on this survey was reported in a 1987 ERIC monograph, this second edition differs substantively from that work in several ways:

- The review of the literature has been recast in the form of guidelines for planning and implementation.
- The review of the literature and the sources used in the main text have been updated through spring 1989.
- The "Online Guide: A Path to Published Resources" has also been updated and expanded.

These changes were made by Barbara Minor and Michael Eisenberg from the ERIC Clearinghouse on Information Resources. The authors fully acknowledge and appreciate their contributions to this effort.

THE ONLINE WORLD: A SCHOOL VIEW

Online searching in schools is a relatively recent phenomenon with a limited published literature on the subject—a literature of essentially a popular rather than a scholarly nature. The earliest reported access to online databases was in 1976, when high school seniors in the Montgomery County Public School System in Maryland were allowed to supplement their manual information gathering by submitting search requests to the district's Professional Library, where their searches were carried out by professional searchers (Dowling, 1981). The first online account in a school, i.e., an instructional password for training students to search, was obtained from DIALOG in 1980 by Radnor High School in Radnor, Pennsylvania, when online services were introduced there. Since that time a growing number of school library media specialists and administrators at the local and state levels have acknowledged the importance of providing information for students from electronically available sources by their actions, i.e., acquiring the equipment, training a trainer, arranging for financial support, and developing curriculum materials.

Schools across the country have expanded reference and bibliographic access by going online, although such access is still extremely limited in scale, and where it does occur, is often limited to a special group of students or classes (see the survey results in the following chapter). At the present time, the major search services for bibliographic information that are used in schools are DIALOG and BRS, with WILSONLINE a more recent but important addition. The end-user oriented subsets of DIALOG and BRS—Knowledge Index and BRS/After Dark—are frequently used, and new services for student use, e.g., DIALOG's Classmate, BRS/After Dark Unlimited, and EINSTEIN, are emerging. Although more limited in terms of mention in the school related literature, there are some references to the utility of other online vendors, such as CompuServe, The Source, and the Dow Jones News Retrieval Service, for access to online encyclopedias, video games, news bulletins, book and movie reviews, weather, sports, airline guides, and other

types of information (Lynch, 1987; Pruitt and Dowling, 1987; Shea, 1984).

The available literature discusses when, why, and where online moved into schools; points out the advantages and disadvantages of online access; offers advice on planning and initiating online services; provides examples of online related curricular goals and objectives and cites some available curriculum materials; discusses management considerations in establishing online services; and sheds some light on the effects of online use on student use of materials, including identification of the most highly used and appropriate online databases. The remainder of this chapter reviews some of the key ideas presented in the literature and presents guidelines for school media specialists considering the implementation of online services.

The Advantages of Online Access

There are numerous advantages to connecting students with information electronically. Such access extends the limited resources available to them in the school library media center and thereby increases the potential diversity of information available to solve their information related problems. Students are able to locate the most current information, since online databases are updated frequently. Search time is reduced since access can be gained more quickly to information through indexes that are cumulative and comprehensive. And additional entry points for searching are available, such as key words and phrases. This may mean that the search is more accurate than a manual one, with less likelihood of overlooking or miscopying references from printed indexes. In addition, electronic access creates excitement about the research process, and provides a means to search multi-faceted topics, which is difficult in printed indexes (Craver, 1985; Dowling, 1981; Mancall, 1984; Pruitt and Dowling, 1985; Wagers, 1984). Examples of searches performed in the school setting can help the uninitiated see the steps, decision points, and advantages of searching online (Mancall, 1984; Pruitt and Dowling, 1985).

Teaching students about online searching is also reported as another facet of computer literacy initiatives, part of preparation for success at the college level, easy, and even considered cost effective by Schlinder (1986), who points out that it may be cheaper to access some expensive refer-

ence sources online than to purchase the printed versions for users. Providing access to the broad world of information resources available electronically also makes students aware of resources outside the school (Wagers, 1984), and provides an opportunity for school library media specialists to work in closer unison with teachers, and for students to learn research and problem solving skills and question refinement. Online searching offers a unique opportunity to help students articulate their information needs more clearly, and may be the logical step in developing skills that will make students more effective consumers of information services in the future. Obtrusive measures of the impact of teaching online searching on the behavior of students have shown that students have favorable opinions of the worthwhileness of completed units on online instruction (Craver, 1985). Unobtrusive measures indicate that students who have been taught to search online, even though they may cite few of the materials located through a search, use more current and more diverse materials than those who have not been exposed to online searching (Mancall and Bertland, 1985; Mancall and Deskins, 1984; Wozny, 1982).

Of course, there are some disadvantages that must also be considered. Most importantly, going directly to an online search may not be the best approach for all subjects. For example, a single concept search may be best handled using print tools. Also, due to the limited numbers of online user stations, multiple users of such items as multi-volume indexes and encyclopedias can often be accommodated better by print sources.

Other disadvantages of online use have also been cited:

- Suitable databases for students are not available in all subject areas;
- For the databases that are appropriate for student use, school library collections may be unable to provide the journals and other sources identified by the online search;
- User frustration on the part of the library media specialist and student may result when computer systems are down or when telecommunications difficulties are encountered, especially when student time for library-media related activities is limited to weekly or even daily class schedules;

- The financial element—start-up and training costs, investments in material and equipment—cannot be overlooked by the library media specialist; and
- Additional time on the part of the library media center staff may be required if online is to be added to the existing repertoire of instructional tasks and services provided. (Kachel, 1986; Levinson and Walcott, 1985; Mancall, 1984).

Goals and Objectives for Online Information Services and Instruction

Establishing online-related curricular goals and objectives raises a number of instructional questions which the existing literature addresses only in part. First, there must be consideration of why students should be "put online." Mancall and Deskins (1984) point out that logical goals for introducing online to students include (1) generating new opportunities for instruction; (2) creating enthusiasm for the research process; and (3) expanding the student's knowledge of the diversity of information available, as well as the various existing facilities that can provide that information. Aversa (1985) claims that if school library media specialists accept these as basic goals, instruction must address both the teaching of online skills and expanded instruction in the role of information resources outside the school library media center.

In their chapter on the introduction and management of online information services for students, Aversa and Mancall (1986) expand the discussion of potential instructional goals to include: (1) training students to become knowledgeable information seekers; (2) expanding students' perceptions of how to access their information environment; (3) assisting students in refining their information search process; (4) creating enthusiasm among students for independent investigations; (5) working cooperatively with teachers in planning online instruction that is integrated with classroom activities; and (6) expanding the knowledge of teachers and administrators about what information is available electronically and how to access it.

In looking well beyond the school related literature, Aversa (1985) reviews research that has shown that most training programs are weak in their documentation and lack

measurable objectives for trainees. Two classes of knowledge and skills that must be part of instructional programs have been identified: (1) *system-independent skills* that will allow students to understand concepts of information retrieval and how to analyze search problems and design suitable search strategies; and (2) *system-dependent skills* that will permit students access using system commands and protocols, and that will provide them with mechanisms for understanding database design and how to remain current on system policies and procedures (Borgman, Moghdam, and Corbett, 1984). In addition, Aversa (1985) suggests that students must be taught when an online search is preferable to a manual one and why. Some of these points have been considered in materials and courses that have been developed for students.

Tenopir (1986) argues that online searching is not just a means of finding articles and reports for research projects, but a process that will help students learn research and problem-solving skills and require them to use logical thinking processes as they develop search strategies and work with the librarian to refine their topics for a computer search. In one class exercise described by Mancall (1984), ninth grade science honors students were assigned to write a paper on the general topic of energy which would include both retrospective and current information from a variety of sources. Many students were interested in solar energy, but this topic was still too broad, and one student narrowed it down to costs of solar power for residential use. With assistance from the library media specialist, the student identified the three searchable concepts in the topic—solar power, costs, and residential use. Still working with the library media specialist, the student considered the types of documents that might contain the desired information and selected an appropriate database for the computer search. The search strategy was then mapped out by selecting search terms for each of the concepts and determining the Boolean operators that would indicate the correct relationships among the sets of terms (pp. 66-67).

Getting Started

In order to consider initiation of online information retrieval for students, a school library media specialist must, of course, understand what online access is and be

aware of the types of information that are available and suitable for students in the online world. It is also essential to identify the equipment and telecommunications arrangements that are needed, and to obtain some ballpark figures on potential costs. Goals, objectives, and curricular materials must be developed, adapted, or obtained, and policies and procedures must be established. Finally, both formative and summative evaluation of the program must be provided for.

Program Planning

The process of planning for an online information search service and instruction for students is divided into four major steps for the purposes of this presentation. Guidelines are suggested for each of the steps:

(1) Information gathering to assess available resources;

(2) Formation of an online implementation committee for the school or school district involved;

(3) Determination of both short term and long term goals and objectives; and

(4) Establishment of a plan that will provide a framework for the implementation of the service.

Step One: Information Gathering

A survey of the scene to gather information on resources that would be available to the library media specialist in planning and implementing the program is an important first step. This survey should include identifying resources at the local level, e.g., the presence of a microcomputer in the library media center or elsewhere in the school may mean that the basic hardware component of communications between the center and an online vendor is already in place. If communications software and hardware (i.e., communications card and modem) are already installed on the microcomputer, then that component is ready for use. The library media specialist should be aware of any available faculty expertise, e.g., computer expertise that can be utilized in making decisions on hardware and software. And it

is important to know the amount of financial support that will be available when developing a program.

Resources at the district, regional, and state levels should also be explored. Perhaps there is a similar program already in operation that can serve as a model or be adapted to meet the needs of the local situation. Instructional materials and/or a statement of the goals and policies of such a program may be available for use or consultation, and the people involved in such programs may be willing to answer questions and give advice. Some state departments of education have available curriculum guides with statements of goals and objectives, scope and sequence charts, and lesson plans. Three examples of such aids for library media specialists are *Pennsylvania Online* (1985), *Secondary Library Media and Information Skills Syllabus: Grades 7-12 (draft)* (1986) from the New York State Department of Education, and *A Curriculum Guide for Online Database Searching with High School Students* from the Heartland Education Agency in Iowa (Schrader, 1985).

Step Two: Form Online Implementation Committee.

While the library media specialist may be the person most involved in an online information retrieval program, that person will need the support of both teachers and administrators to implement a successful program. The cooperation of teachers will be essential if online searching instruction is to be conducted in conjunction with projects and assignments for regular classes. Getting teachers and administrators involved in the planning process from the beginning will increase their awareness and understanding of what the program is intended to do and their role in it, as well as their willingness to cooperate. Support from administrators will be vital in facilitating acceptance of the program in the school, as well as in securing the financial wherewithal to implement it. The funds available for the program will help to determine its scope, and an administrator who is involved in the planning and decision-making process will have a better understanding of the amount of funding required to meet agreed upon goals.

We suggest that, if the program is to be implemented on a district-wide basis, this committee should include representatives of the teachers and administrators from all of the buildings that will be involved as well representatives from

the library media specialists at all levels. A committee to plan online implementation in a single building might well include a student as well as the library media specialist and representatives from the teachers and administrators. In both cases, teachers and administrators with relevant expertise should be among the committee members.

Step Three: Determine Goals and Objectives

The goals and objectives of the online program must be agreed upon relatively early in the planning process, as they will determine to a large extent what the program will be expected to do, who will benefit from it, and how it will be organized. Goals and objectives should be flexible and open to revision, however, as this is not only a new area, but subject to rapid technological change.

Seven goals that could serve as a model in the development of goals appropriate for the local online program are briefly discussed below (Aversa and Mancall, 1986). Of course, these goals must be considered in the context of the local situation and the resources available.

(1) *To prepare students to become knowledgeable information seekers.* If students are to be prepared to cope effectively with their information needs in an increasingly electronic world, they must be aware of the vast resources of information available to them in thousands of online databases and know how to obtain the specific information they may require, whether they wish to conduct their own online or CD-ROM searches or work through an intermediary, i.e., a professional, trained online searcher. Some of the standard reference works with which they should be familiar are currently available both in print and online—e.g., *Reader's Guide*, *Magazine Index*, and *Books in Print*—as well as *Grolier's Electronic Encyclopedia* (a CD-ROM version of their *Academic American Encyclopedia*) and the ERIC database. While electronic versions may never replace print versions entirely, they offer definite advantages for the searcher with a complex topic and a need for the most recent materials. Kuhlthau (1987) argues that:

> At the core of information literacy is the ability to recognize a need for information. The person must become aware of problems and questions which require informa-

> tion, and must approach information seeking and use as problem-solving activities. . . Library instruction that guides students through the levels of information needed to solve a problem or to shape a topic enables them to use information for learning. Instruction that helps them develop a realistic perception of an information system prepares them to be more successful searchers. (pp. 8-9)

It is in the process of defining the information need, and determining both the search strategies and the information sources appropriate to that need, that the student's problem-solving and critical thinking skills come into play. The determination of the usefulness or relevance of the information retrieved involves further use of these skills.

(2) *To expand students' perceptions of how to access their information environment.* Electronic access to information means that students are no longer confined to the use of reference sources organized by the type of question, i.e., encyclopedias for an overview of a topic; directories for specific facts about people, organizations, and institutions; or indexes such as *Reader's Guide* for periodical articles, collections of short stories, essays, poems, and songs. With online tools, students will be able to generate references to many types of sources using a subject approach to a problem. They will also have to learn how to locate and access materials cited in a search that are not available through the school library media center, which means that the library media specialist will have to train them to use other local resources, including public, academic, and special libraries, as well the library media center. The library media specialist will also have to initiate cooperative arrangements with these local resources so that students will be able to make use of them. It has been found that students exposed to online searching—and provided with access to materials cited in a search—use more varied and more recent information sources in completing school projects, even though they may not use many of the materials cited in the search (Wozny, 1982). Increased use of interlibrary loan and cooperation among libraries will likely expand their actual use of outside resources.

(3) *To assist students in refining their information search process.* Using a computer to locate the answer to a question or to locate references on a given topic requires that ideas and concepts be stated clearly and in a meaningful manner. In order to do this, students must engage in a process approach, which includes an understanding of how to negotiate and clarify a topic, transformation of the topic into statements that can be searched online, selection of appropriate search terms, preparation of a search strategy, determination of the relevance of materials retrieved, and consideration of alternative strategies based on a review of the results. This kind of problem-solving exercise should also contribute to the development of the students' higher order thinking skills, a matter of considerable concern in current efforts to improve the educational process in the United States. The skills developed for online retrieval will be valuable to the student in information seeking well beyond the online environment.

(4) *To create enthusiasm among students for independent investigations.* The reason for going online that is most frequently offered by practitioners is that they feel that successful online services in the library media center engender enthusiasm among students. This enthusiasm may spread to teachers and administrators and inspire them to work cooperatively with the library media specialist to integrate information seeking skills into the curriculum. Library media specialists should keep in mind, however, that after the novelty effect wears off, some of the enthusiasm may well die down (Richardson, 1981). Availability of sources is a key to fulfilling expectations, meeting needs, and maintaining enthusiasm. Online databases contain citations to a wide variety of materials, many of which are not available in the school library media collection. Resource sharing with other school library media centers, public libraries, and academic libraries in the area may provide access to some of the documents or articles desired, and interlibrary loan services may be able to supply more. Cooperative collection development with other schools could help to make more expensive periodicals that are in infrequent demand available to students without straining the budget at any one school.

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(5) To work cooperatively with teachers to integrate online instruction into classroom activities. This essential goal is at the heart of the online planning process, but there are several considerations that should be dealt with before measurable instructional objectives are developed.

- The purpose for teaching students to do online searching must be determined.
- Who will do the actual online searching must also be decided, i.e., whether students will conduct their own searches online, or whether an intermediary will do the hands-on searching of student-developed search strategies. The former provides the student with the opportunity to interact with the system by evaluating the results of each step as the search progresses and making revisions that will improve the final result; the latter provides more control over search quality, which leads to more control over online time and cost.
- To ensure that the process will be meaningful, the classroom instructional activities that would be the most appropriate to the introduction of online access to information must be developed cooperatively by the library media specialist and the teacher. Such joint planning is essential for the integration of information retrieval skills into the curriculum. Kuhlthau argues that, if a library exercise is to be meaningful to the student, "assignments must be designed to create a personally felt information need" (1987, p. 8). This is more easily accomplished if the exercise—or topic to be searched—is course related. Although teacher/librarian cooperation in curriculum planning is frequently described in the literature and widely advocated in the field, information on the number of cooperative efforts and/or the degree of teachers' acceptance of the practice is as yet difficult to find. One report describes a project in the Pulaski County Special School District (Arkansas) to promote such involvement, and it includes a measure that was used to track the involvement of library media specialists in instructional planning (Patrick, 1985). Essentially a tally sheet to record the occurrence of a particular action or service, this instrument was developed and used as part of a systemwide effort to improve instruction in the school system. The study found that when library media

specialists are expected to behave in a certain way and know that their services are being measured, their behavior changes, and the amount of instructional planning doubled in one year. Patrick includes a detailed description of the measures taken to encourage school library media center involvement in curriculum and learning. Bhalla (1986) briefly describes a library media center initiated project that combined classroom instruction with library media skills for a fifth and sixth grade social studies unit in an Iowa City elementary school.

- Both teachers and administrators should be involved with the school library media specialist in developing a search access policy. Concerned with who is allowed to search, when, where, and at what cost, this policy entails the determination of the number and location of terminals, who can use them, and how much money can be spent for online searching and document delivery services.

(6) *To expand the knowledge of teachers and administrators about the online world.* Searching to provide teachers and administrators with relevant references to materials for making administrative and curricular decisions is at least as widespread as service to students (Mancall and Bertland , 1985). The use of this service by these two groups may be encouraged by the development of publicity brochures as well as inservice training to increase their knowledge of what is available, how it can be accessed, and how materials not available in the local collection can be obtained.

(7) *To provide documents on demand to meet the needs of teachers and administrators.* This goal is a critical one if the school believes information must be made available on a timely and on a demand basis. Online access provides the opportunity to address topical needs as they arise—needs that have not been identified with sufficient time to allow the school library media specialist to locate and order suitable materials. No school library media center can expect to hold many of the documents that are referenced as a result of an online search. With the exception of databases devoted to popular magazines and journals, most references retrieved will be to items that are not part of the school collection. Meeting the need for requested documents means

the school must develop policy and financial support for the acquisition of materials identified as relevant by teachers and/or administrators, whether through interlibrary loan or by ordering them directly from the database producer. The latter may be expensive but must be considered if this goal is accepted.

Documents are available—for a fee—through some database producers, such as ERIC, Chemical Abstracts, the Institute for Scientific Information, the American Psychological Association, and Sociological Abstracts. Journal articles from a wide variety of periodicals are available through University Microfilms International, including about 65 percent of the journals indexed by ERIC. The citations in CIJE for articles from these journals will include the notation UMI. (See Appendix A for the addresses of these services.) Information on the availability of documents from other databases should be included in the documentation supplied by the vendor, e.g., DIALOG Information Services or BRS. If students are to obtain the source documents or articles from such services, a policy must be established that specifies who is responsible for the fees.

As stated above, online searching will create a new awareness of the diverse world of documents that are available. Student, faculty, and administrator perceptions of preferred information resources will change as a result of successful searches. This means that locating and meeting the demand for items requested will become increasingly important in school settings. Increased demand for materials in a timely fashion could be partially met through sensible cooperative collection development among local area libraries, interlibrary loan, and/or use of commercial delivery services.

Step Four: Establish a Plan

Once the purpose of the online information service is determined and the goals and objectives are spelled out, a detailed plan for the implementation of the service should be developed to provide guidelines for the various activities and decisions involved in the process. Such a plan could be divided into ten components:

(1) Hardware and software selection and purchasing, including telecommunications software;

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(2) Selection of an online database vendor (or medium, i.e., online or CD-ROM);

(3) Defining audiences, i.e., who will receive instruction;

(4) The establishment of policies and procedures for access to the service, appropriate recordkeeping, etc.;

(5) Setting up a budget and estimating costs for both operations and services;

(6) Provision for training for the library media specialist, professional and support staff, and teachers;

(7) Development of instruction for students, preferably integrated into the regular curriculum;

(8) Setting up criteria for evaluation and scheduling formative evaluations to obtain feedback for improving the program as it is being developed;

(9) The initiation of the program/service; and

(10) Evaluation of the established program and its impact on students.

Component 1. Selection of hardware, software, and telecommunications service. The availability of a microcomputer in the school library media center means that the basic component of communications between the center and any dial-up service is already in place (Swisher and Mancall 1986). Other components needed for online access include:

- communications software;
- a serial communications interface;
- a modem; and
- a printer, if the capability to print out results while doing a search is desired. In addition, if products of searches are to be stored (i.e., downloaded) for future use, the communications software must have this feature.

If there is no microcomputer already available in the media center or the purchase of a different one is desired, there are several factors to be considered. Will the microcomputer be dedicated to information retrieval, or will

it also be used to run instructional and management programs or for programming (Pruitt and Dowling, 1985)? Will more than one disk drive be needed, and if so, should one of them be a hard disk? Are compatible telecommunications software and peripherals—e.g., modems, monitors, and printers—available that have the desired capabilities? Is quality software available for the other envisioned applications?

In selecting a modem and telecommunications software, it would be wise to consider whether the capability to print out results or to download search results for storage on disk and editing is desired, as well as ease of use. Also to be considered is the quality of printout desired for the final search results. Will dot matrix be satisfactory, or will letter quality be required? Costs are, of course, a major factor in all hardware and software decisions.

Component 2. The selection of an information utility, or online database vendor. This also involves several considerations.

- Would the databases available from the vendor be appropriate for the curriculum areas that will be involved in instruction?
- Does the library media specialist or another staff member have experience searching on one particular system?
- Does the vendor offer special rates and/or programs for schools and other end users?

Special programs include BRS/After Dark and BRS/After Dark Unlimited from Bibliographic Retrieval Services and DIALOG's Knowledge Index and Classmate. Of these, BRS/After Dark and Knowledge Index are designed for use after regular business hours at reduced rates, while the other two are designed for library and school use. Programs are also offered or under development by Dow Jones News Service, Einstein, and WILSONLINE (H. W. Wilson Company). Specific databases frequently searched in schools are listed in the next chapter, and the addresses and customer service representatives for four of the major information utilities are listed in Appendix B.

Less expensive (and less sophisticated) online alternatives are also suggested by Pruitt and Dowling (1987), who

describe the use of electronic bulletin board systems (free except for the cost of the telephone call) and CompuServe to introduce students to online information systems.

The current and growing availability of online databases on CD-ROM might also be considered as an alternative to online searching. The major advantage would be the fixed cost of database use, as the disks are marketed on a subscription basis rather than the hourly charge used by online vendors and telecommunications networks. In this case, increasing the amount of searching would lower the costs of individual searches and allow for experimentation without raising the total cost. However, the initial investment in equipment (a CD-ROM player with a special card and a microcomputer) can be expensive, as well as the subscription rates, especially since the CD-ROMs currently available from different producers may have different hardware requirements. And if recency of information is an important consideration, the fact that videodisks are not updated as frequently as the online databases (e.g., quarterly or annually as opposed to monthly) may make CD-ROM a less attractive alternative (Barlow, 1987; Schamber, 1988).

Subsets of databases on floppy disk, together with the appropriate microcomputer software, are another alternative to online access. Such systems provide access to selected portions of a database and can be used as simulation tools to teach search techniques before students go online. ERIC MICROsearch is among the suggested systems of this type (Tenopir, 1986, p. 61).

Component 3. Define Audiences. Even if the desire is there to offer instruction in online searching skills and services to the entire student body, faculty, and staff, it may well be more prudent to begin on a smaller scale. Instruction could be offered to high school seniors for the first year while procedures and policies are being refined on the basis of experience, a basis for cost projections is being established, the impact on students is being assessed, and the effectiveness of the instructional approach and materials being used are evaluated. Such short term planning could provide for extending the program to an additional grade level or levels each year as seems appropriate and resources are available. Instructional materials and procedures could also be revised and new materials and strategies developed for other grade

levels based on experience. If information services are to be extended to faculty and staff, this too could be introduced progressively, moving from having an intermediary perform searches to end-user searching (if this is the long term goal) as training can be provided.

Whether students will be permitted to go online and perform their own searches, or whether they will be restricted to developing a strategy for a professional to use, may also make a difference in the audience to whom the program will be made available.

A small, pilot program for the first year with demonstrable results could provide a means of gaining the support of any teachers and/or administrators who are dubious about the value of such a program.

Component 4. Development of Policies and Procedures. Policies and the procedures to implement them must be developed if the program is to run smoothly. Areas for which formal policies are needed include who will receive instruction; whether it will be planned cooperatively by teachers and the library media specialist and integrated into the regular curriculum; whether students will have hands-on experience in online searching or be required to work through an intermediary; where the microcomputers for searching will be located and when students will have access to them; any limitations on the amount of time and/or money individual students can expend on searching; whether search results will be downloaded to disk and edited locally; whether students will be permitted to print search results online; the kinds of records and data that will be kept for evaluation purposes; the kinds and frequency of evaluations that will be conducted; the kind and amount of training to be made available for library media staff and other staff and faculty members; provisions for equipment and software maintenance and upgrading; whether instructional materials will be developed locally or adapted from already existing (and tested) materials; how students will be made aware of the program and encouraged to make use of online searching; and the involvement of parents in the program.

Component 5. Budgeting. Some of the financial parameters that must be considered in planning for online services are signaled by Aversa and Mancall (1986), who point out that

in budgeting for online services, the school library media specialist faces planning for a service that has no history; therefore, initial budgeting will have to include funds for anticipated service use and will have to be based on local projections which may differ widely between schools and school districts. The rationale for the budget will depend on the goals and objectives established for the program. Specific budget items will fall into the categories of capital expenses for equipment and space needs; operating expenses for connect time, communication costs, supplies, documentation, and professional training; and additional operating expenses such as print charges, fees for saved searches, and costs of online ordering, if these are allowed. A cap on the amount that individual students can spend for online connect hours is advised.

Miscellaneous expenses must also be accounted for, such as equipment upgrades and maintenance, and travel to online conferences and demonstrations. A sample budget presented in *Pennsylvania Online: A Curriculum Guide for School Library Media Centers* (1985) assumes that the librarian already has available a microcomputer, a disk drive, a printer, and a telephone line. This budget breaks down a total expenditure of $2,225 into three categories: equipment (serial interface, modem, communications software, and cables and connectors), $475; connect time (classroom instruction for 200 students at one half hour each @ $15/hour and 10 hours of demonstration and teacher preparation @ $15/hour), $1,650; and supplies and documentation (ribbons, paper, disks, manuals, thesauri), $100 (p. 56).

Component 6. Training for School Personnel. The library media specialist, as the person responsible for providing online services and for teaching information skills to the students as well as for training other school support staff, administrators, and teachers, must have or develop skills that may not have been included in the library media curriculum.

Aversa and Mancall (1986) suggest that knowledge in six areas is needed. *First, there is a need to develop enhanced interviewing skills in working with students and teachers, particularly in the pre-search stage.* Remarks from vendors call attention to the fact that 90 percent of mastering online

searching is in perfecting the presearch process (Caputo, 1983). Aversa and Mancall (1986) suggest that forms to assist with structuring searches to be conducted in the school library media center might include: (1) the name and status of the searcher (student and grade level, teacher, etc.); (2) date of request or date of search; (3) search topic (briefly described in one or two sentences); (4) keywords (terms, phrases, or concepts that describe the topic); (5) known works or articles on the topic to provide guidance to the searcher if easily available; (6) age range of materials desired; and (7) fee limit (amount allowed or amount willing to spend). The form could also include the satisfaction of the user with the search and the cost (p. 232).

Second, the school library media specialist who decides to offer online service and instruction must be able to *sort out the advantages and disadvantages of using different vendors and understand the content of databases available.* Library media specialists are urged to read and study directories and database documentation available from vendors; attend conferences directed to online; and consult journals such as *Online* and *Online Review* that can direct novices to opportunities for learning about systems and databases.

Learning to search, the third skill needed, requires training, time to practice, and continuous use of the system learned. Such training is offered at various geographic locations by the major database vendors, including DIALOG, BRS, and WILSONLINE. Workbooks and tutorials are also available to supplement the training received (see the following chapter for more details). In addition, schools of library and information science offer formal coursework, and local inservice opportunities may be available. In choosing a training opportunity, it is important that library media specialists: (1) make sure that the training selected is at an appropriate level, especially if they are novice searchers; (2) try to find an experienced instructor, if possible one who is used to teaching generalists rather than specialists; (3) make sure the training includes hands-on experiences and materials that can be used after the training concludes; and (4) plan to practice using at least five hours of online time before attempting to instruct students or teachers.

Since the school collection will not be able to supply most of the materials located through an online search, school

library media specialists must consider a fourth skill: *developing and utilizing interlibrary cooperation*. This includes knowing other community resources and having formal and informal ways of accessing materials in their collections, and knowing how to access materials not available locally through interlibrary loan or document delivery services.

Skill area five deals with *developing management strategies, such as recordkeeping for control of finances, planning, training, general collection development, and assessment of adequacy in meeting previously set goals and objectives for this service*. Database vendors can help in establishing contractual procedures, particularly in regard to the use of instructional passwords and minimum usage, and can also help with information about set-up costs, equipment needs, and billing requirements. Useful recordkeeping procedures include the development of forms that capture appropriate data; search request forms to help the user clarify the steps and information needed to perform (or have performed) a successful search; online logs that keep records of search activity, including who is searching, subjects most often requested, subjects most successfully searched, relevance of references retrieved, availability of relevant references, and cost parameters per database and per relevant item retrieved. Examples and discussion of logs covering such items can be found in Aversa and Mancall (1989).

In developing the sixth skill, *knowing how to teach online searching*, the primary consideration is the establishment of clear instructional goals, including how many systems and how much in-depth knowledge of these systems is expected (Aversa, 1985). Online teaching also requires adequate financial commitment, since terminals and telephones should be available in sufficient number to allow students to practice. This means enough online time should be budgeted for demonstration and practice, and audiovisual aids, handouts, workbooks, and vendor search guides should be made available. Help in teaching can come from allowing and encouraging students to teach each other and from obtaining available teaching materials (e.g., Hunter and Lodish, 1989; *Pennsylvania Online*, 1985; Schrader, 1985). Before reinventing the wheel, library media specialists should look at materials developed by others.

Training for other support staff, teachers, and administrators should be designed to increase their awareness of online searching and the goals of the program being implemented; their role in the program, e.g., cooperative planning by teachers and the library media specialist; the benefits of online information service for them in their professional capacities as well as for the students; and the development of support for the program from these groups. If one of the goals is to encourage faculty and staff to do their own searching, then training must also cover the information skills they will need. Training sessions could be set up as workshops, special programs, or inservice training for teachers, and presented by either the library media specialist or an outside expert.

Component 7. Developing Courses in Online Skills for Students. Courses targeted for online instruction should be courses that all students take, that are leveled, and that have a curriculum allowing for a variety of topics, according to Lodish (1987). Her criteria for selecting units within courses include the need for data analysis, such as statistical and demographic information; units that evaluate a wide range of controversial topics; and topics requiring currency of information. As with teaching any library media skill, the instruction should be integrated with actual classroom curriculum and not taught in isolation.

In developing a course for high school seniors, Craver (1985) lays out nine specific objectives for students. She states that on the completion of a course students should:

- Possess a basic understanding of what online searching is;
- Be cognizant of relevant online searching terminology, including Boolean operators, access points, and limiting functions;
- Be aware of the variety of available databases and comprehend the selection process;
- Have a rudimentary knowledge of the thesauri and indexes that are used in the preliminary stages of search strategy formulation;
- Be able to posit a tentative search strategy in terms of Boolean logic upon directed topics in preparation for actual online searching;

- Be able to correctly interpret a bibliographic record and evaluate the results received;
- Observe the execution of their search strategy on a selected database;
- Utilize some of the citations as research for their debate topics; and
- Be knowledgeable about the advantages and disadvantages of online searching.

In developing instructional methods and materials, Craver (1985) used a printed manual that was:

> Prepared by the librarian and graduate library assistant. The manual contained an annotated list of 30 searching terms, 18 selected databases, a case study, examples of ideal and actual search strategies, a sample bibliographic record, a presearch preparation form, and a list of the advantages and disadvantages of online searching. (1985, p. 131)

Lectures, case studies, audiovisual demonstrations, and small-group assignments were some of the strategies she used for the instruction of students. All of these techniques have been suggested in the online literature as appropriate methods for training people to search.

Curriculum materials are beginning to appear, including a curriculum guide prepared by a committee of selected educators in Pennsylvania to assist both novice and experienced school library media specialists in teaching students to engage in online searching (*Pennsylvania Online*, 1985; an updated edition is scheduled for early in 1990). This guide is divided into four sections, each of which specifies objectives, content, suggested resources and materials, expected levels of achievement, and procedures for evaluation. The four sections of the document focus on (1) the role of information in society; (2) developing a search strategy; (3) conducting a search; and (4) recordkeeping and evaluation. A more recent contribution from the New York State Department of Education, *Secondary Library Media and Information Skills Syllabus, 7-12 (draft)* (1986), is divided into the three general areas of skill development—inquiry and investigation, reading guidance and literature appreciation, and computer and nonprint

resources. Each section contains an explanation of the concept, objectives derived from the concept, learner outcomes, and grade levels appropriate for teaching and reinforcing the concepts. Online search skills are stressed in the last general area.

The three major vendors—DIALOG, BRS, and WILSONLINE—also have, and appear to be in the process of continually developing, materials for student instruction. Additional details on these materials are provided in the following chapter.

A number of alternative strategies for teaching students have been tried. It is not unusual to find the suggestion that students begin with a manual search (i.e., using the card catalog, traditional print indexes, and catalogs), and then request a computer search. Although this is a feasible approach, it negates one of the main advantages of an online approach—i.e., looking at a multifaceted subject in a way that is not possible using printed resources.

Library media specialists should become aware of the characteristics of requests that are most suitable for an online approach, such as topics involving several subject and non-subject concepts. Wagers (1984) gives the example of "the effects of parent participation on student achievement" (a topic difficult to search manually), and topics with current, jargon-ridden words that are not yet searchable in printed tools.

There is also some difference of opinion about who actually sits at the terminal and does the search. In some cases, media specialists do the actual searching after discussion of the topic with students, going over keywords, selecting databases, and mapping out search strategies (Mancall and Deskins, 1984). In such instances, students fill out search request forms and searches are performed for them as time permits. In others, student assistants are trained to run searches, and in yet others, students do their own searching. Decisions about "who" does the searching should take into consideration the goals and objectives of the training program and the desired behavioral outcomes.

Component 8. Evaluation of the Effects on Students and Student Use of Materials. Various techniques have been used to assess the impact of teaching online searching on the behavior of students. Measurement strategies have been

both obtrusive and unobtrusive. Obtrusive measurement, such as directly asking students' opinions of the worthwhileness of completed units on online instruction, was engaged in by Craver (1985), who reported the results were positive. Unobtrusive measurement, such as comparing the referencing patterns in the papers of students who have been given the opportunity to search online with their online search printouts has shown that, although few materials that are identified in an online search are actually used in the bibliography of a completed student paper, students who have been taught to search online use more current and more diverse materials than students who have not been exposed to this method of information retrieval (Mancall and Bertland, 1985; Mancall and Deskins, 1984; Wozny, 1982). The two forms of evaluation should probably be used together, as neither method assesses both the question of educational impact *and* user satisfaction.

Testing and keeping records of particular types of use have also been adopted as means of examining student response to online training. Students have been tested in understanding of terminology, selection of appropriate databases, search strategy formulation, and interpretation of an online citation (Craver, 1985). Online logs have been used to capture evaluative data, such as who is searching and for which courses; the level of satisfaction of those who search or request a search; the subject areas that are most frequently searched, in which databases, and with what success; the types of materials that are being referenced; how many relevant references are retrieved and the average cost per relevant reference; and how many relevant references are located on site, i.e., in the school library media center, and how many are available locally or through interlibrary loan (Mancall and Bertland, 1985). Among the frequently searched databases identified are Magazine Index; ERIC; Abstrax 400; Books in Print; Biography Master Index; Historical Abstracts; Newspaper Index; Energyline; and Enviroline (Dowling, 1981; Mancall and Bertland, 1985; Mancall and Deskins, 1984; Pruitt and Dowling, 1985; Schindler, 1986; Wagers, 1984; Wozny, 1982).

Discussions of problems associated with database searching focus on the sophistication of many of the materials referenced and the necessity for having well-functioning interlibrary loan arrangements available, since many of the

materials that appear relevant are not part of school collections. Callison's (1988) study of the online experience of 41 high school juniors focused on whether students actually used the materials identified and borrowed as a result of online searching. Comparisons of students' interlibrary loan request forms, online printouts, and the bibliographies attached to their completed papers and projects, indicated that a substantial percentage of key sources (i.e., frequently cited items) could be attributed to online searching.

Few basic patterns have been uncovered. As noted, however, Wozny (1982) reports that regardless of the absence of online references in student papers, students taught online searching use more current and more diverse types of materials than similar students who are not exposed to this innovation. She believes that the major influences on the student are the teacher and the cooperating school library media specialist who use online searching as a technique to achieve their educational objectives, i.e., assisting students to develop appropriate search strategies and expanding their conceptions of the different types of information available.

Component 9. Implementation of the Program. The literature contains case studies of how online has been introduced as well as suggestions for how it should be taught. For example, Schindler (1986) selected DIALOG as a suitable vendor because of the Classroom Instructional Program rate of $15 per hour of connect time. A vendor seminar provided initial training. The *DIALOG Blue Book* (a compendium of databases with explanations of the unique features of each) was purchased; an account number and password were secured; and an internal modem was installed on the library's IBM microcomputer to modify it for online searching. Faculty were introduced to this innovation through a workshop. Lesson plans were written that included objectives for students, and procedures for instruction and evaluation were developed.

Swisher and Mancall (1986) suggest that:

> The introduction of service can best be facilitated by working with a small number of individuals, using a limited group of databases. In the simplest approach, the school library media specialist works with one class on a

research project which demands information beyond that contained in classroom texts. (1986, p. 122)

As the service is developed, educational goals and objectives should be clarified before instruction begins.

Vandergrift, Kemper, Champion, and Hannigan (1987) question whether or not to skip online systems altogether at this point and wait to move directly into CD-ROM (compact disc-read only memory) applications. If libraries choose to purchase CD-ROM equipment and gain access to databases in disc format on a subscription rather than a connect time basis, unlimited searching of locally held databases is possible. However, the initial investment for each database on CD-ROM is expensive; disk players are currently limited to one station so that only one database can be used at one time; and there is no easy method of changing disks.

Vandergrift et al. suggest a process for initiating service that includes conducting a feasibility study; creating a planning document that addresses library objectives, personnel, equipment, facilities, and related expenditures; evaluation of hardware and software; analysis of contractual and subscription agreements; and development of policies and procedures for staff and patron use.

Barlow (1987) discusses factors that must be considered in making a full-text CD-ROM database available to students, including hardware and software considerations, the configuration of the system, security problems, costs, and the amount and type of training required by high school students to make effective use of an electronic encyclopedia.

Component 10. Program Evaluation. As with any good program plan, the plan for offering online services and instruction must include provisions for evaluation. Four steps are suggested here:

(1) Return to the original goals and objectives. Have they been met? Where were the bottlenecks?

(2) Survey the students, administrators, and faculty to identify their frustrations, successes, and any needs for adjustment and/or expansion.

(3) Compare the program to those described in the literature and other similar programs. Have others encountered the same problems? If so, how have they solved them?

(4) Consider the future. Where should the program go from here? Review the original goals, make revisions, and plan future directions.

Some Rules of Thumb

Even though this pioneering effort may seem overly complex and intimidating, if library media specialists will keep the following general guidelines firmly in mind, the implementation of online services and instruction should be entirely feasible.

- Be flexible.
- Don't try to reinvent the wheel or start from scratch. Make use of available materials and build on the experience of others.
- And above all, don't be afraid to make mistakes. Most people do, and few mistakes result in lasting damage or disaster.

As we move into the information age, it is no longer a question of *whether* library media centers should offer online services, but *when* and *how* such services should be implemented. The needs of students demand no less.

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THE ONLINE STUDENT IN 1986: A SURVEY OF CURRENT PRACTICE

To date, the review of the literature of online services in the school setting reveals much of the experience of pioneers who have introduced online in school libraries and media centers, and these experiential accounts are indicative of the increases in the provision of online information sources to students. A survey of online providers in the schools was designed and carried out to suggest an overall picture of the state of online in the schools in 1986. This section summarizes the findings of that data collection and evaluation effort.

Although no new data have been collected since 1986, the authors believe from both personal observation and contact with the field that the anticipated substantive growth in online services in schools is, in fact, occurring. Examples of increased interest include the special full day conference on online in education scheduled in conjunction with the Online 1989 conference to be held in Chicago in November, and the recently initiated newsletter, *Online Searcher: A Newsletter for Teaching Online Searching in Education*. Thus the findings of the study reported below are still highly relevant to practitioners and researchers interested in online services in school settings.

Objectives of the Survey

The objectives of the survey were three-fold. First, an effort was made to identify providers of online information services in the schools from all areas of the country in order to establish who the current providers are, where they practice, and what their services are. Second, once online providers were identified, they were queried as to practice, policies, and the particulars of their services so that current practice could be described. Finally, to facilitate communication between school-based online service providers and the major vendors of online information services, the vendors were asked to report on their programs for the school audience and for directory information on contacts.

Survey Methodology

In order to identify school-based providers of online information services, a brief survey was sent to the state level school media supervisors in all states for which a state level person was listed in *The ALA Yearbook, 1985*. The state school media supervisors were asked to list the names, addresses, and telephone numbers of providers known to them. Thirty-three state level supervisors responded to the questionnaire, and their responses led to the identification of 71 online providers in the schools. A survey instrument consisting of 41 questions was distributed to the 71 individuals. An additional nine questionnaires were distributed at a meeting of the American Library Association, for a total of 80 questionnaires. Forty-five usable questionnaires were returned in time for inclusion in the data analysis, for a response rate of 56 percent.

Data from the returned survey instruments were analyzed using the frequency and descriptive statistics programs of StatPac—Statistical Analysis Package for the CP/M Operating System, 1985 issue, by Walonick Associates.

Finally, a third questionnaire was issued to online vendors. That questionnaire solicited open-ended responses to questions about school-oriented services and industry contacts for school media specialists providing online services.

While the surveys were not random, the responses indicate that interest in online information service is prevalent in schools in all areas of the country, and that certain practices are widespread enough to provide a framework for describing the online student in 1986.

Survey Findings

The online student in 1986 is described in accordance with survey findings on four basic questions: who is searching, what the policies are regarding online in schools, what services are provided, and who the providers are. Percentages given in parentheses in the following paragraphs indicate the proportions of respondents to the questionnaire answering as indicated in the statement.

Who is searching in the schools?

The secondary school student who has been exposed to online searching in late 1986 is likely to attend a school which

Table 1. Experience of School Media Specialists in Providing Online Service.

No. of years online	Percent	Cumulative percent
0 to 1 year	15.0%	15.0%
1-2 years	30.0%	45.0%
3-4 years	37.5%	82.5%
5+ years	12.5%	95.0%
No response	5.0%	100.0%

serves grades 9 through 12 (57%). The provider of online services is most likely to be a school librarian or school library media specialist (86%), but teachers and students themselves are also apt to be searching in about half the schools surveyed (22% and 44% respectively). Generally the student who is online at school has some special status in the school—perhaps a member of the honors class in science or social studies, a member of the debate team, or a participant in an instructional program for which online is a part. In only 4 percent of the schools can any student search at any time. The representative student attends a school

Table 2. Sources of Training of Media Specialists for Online Searching.

Type of training	Percent of media specialists reporting participation
Vendor training	64%
Self-study	44%
Library school courses	31%

Note: Since media specialists reported multiple types of training, total is greater than 100%.

where online access has been provided for between one and four years (65%).

The provider of online services was probably trained in online searching by one or more means: a vendor or database producer (64%), through self study (44%), or library school courses (31%).

If the student is being taught to search alone, it is equally likely that training is provided through formal presentations as through informal means (69% and 66%). A textbook or other printed materials are probably not used by the student learning to search (69%), but if print aids are used, the media specialist suggests vendor-produced materials (29%).

The student who has been introduced to searching in 1986 probably has no opportunity to really practice searching skills (60%), but if practice time is allowed, the school library media specialist generally determines the amount of time that is "appropriate."

The student who is searching in school may find teachers and school administrators learning to search, too, as 78 and 58 percent of respondents allow instruction of teachers and administrators. The student is far less likely to find a member of the general public at the next terminal—only 7 percent of the respondents allow the public to use search facilities of the school.

Policies for online in the schools

In 1986, it appeared that the student who was searching online databases at school was searching primarily for course-related information with the permission of the school library media specialist (62%), or as part of the formal library skills instruction program (51%).

The student was unlikely to pay for online time (90%), although the budget for online searching in the school was likely to be a small amount. The average (mean) funding was under $800 annually, with the median amount closer to $500.

The media specialist may have budgeted for online time as a separate budget line (35%), but nearly as many schools reported that online funds came from special grants (31%). The materials budget and instructional budget accounted for funding in 20 percent of the schools reporting.

Table 3. Statistics on Annual Budgets for Online Searching	
Minimum budget reported	$0.00
Maximum budget reported	$3000.00
Mean budget	$756.12
Median budget	$499.99

In spite of the budget size, only 41 percent of the schools reported that students were limited as to the amount of time they could spend online; the online student, if limited at all, was limited in an *ad hoc* manner by the school library media specialist.

Table 4. Budgets and Funding Sources for Online Services.

Source of funds	Percent of schools
Separate budget item	35.0%
Special grant funds	31.0%
Materials budget	12.5%
Instructional budget	7.5%
Other/none reported	14.0%
All sources	100.0%

The online student probably did all the searching in the library or library media center (80%), although 8 percent used search facilities in classrooms or computer labs. Only 2 percent did their searching at home.

The student was unlikely to manage the logon protocols: in 67 percent of the responses a school library media specialist logged the students onto the system or an automatic logon with a masked password was used. These

password monitoring systems probably account for the fact that only one school responding to the survey indicated unauthorized use of the search systems. In most cases, students searching in the schools were using instructional or educational passwords provided by the vendors.

The student was unlikely to maintain an individual search log (9%); more often, a central log of online activity was maintained for the library or media center as a whole (64%). In 26 percent of the cases, no log whatever was maintained, and school library media specialists relied on bills from vendors for record keeping.

For the online student, the school library media specialist was most often the individual responsible for determining when a search was appropriate (84%), and the student had only about a one in three chance of being able to make the determination alone. About 10 percent of the schools reporting said that there was no policy as to who determines when a search is warranted.

The online student in 1986 had only about a 50/50 chance of having the search evaluated by the school library media specialist or teacher. Formal mechanisms for evaluation of student searches (end products) or of search skills were lacking in 51 percent of the schools responding. Questionnaire respondents commented on informal ways in which searches and search skills were monitored, but there was little consensus on who should evaluate and how. This may reflect the newness of the services, uncertainty of staff and teachers, and a lack of guidance in the popular, practitioner-oriented literature.

Finally, the student searching at school was likely to be working under changing policies. Respondents to the survey commented frequently that although no policy was in place when the response was sent, new policies and procedures under consideration were issues to be reckoned with "next year" or "as the service expands."

Systems, databases, hardware and software used in schools

While survey responses varied considerably with regard to policies governing the management of online searching in school sites, the responses were concentrated on the questions of which services, databases, equipment, and software were used. The accounts of the introduction of searching

found in the literature suggest the answers to the queries on what was being used in the schools that provided online services: the online student's exposure to databases, systems, and hardware varied little across sites.

The online student probably searched using an Apple IIe computer as search terminal (72%), and there were probably one or two computers available for searching (67%). IBM personal computers, Digital Equipment Decwriters, and Texas Instruments terminals were used at about one-fourth of the schools, but even if terminals were used, only 6 percent reported having more than two terminals available. Even with few terminals, most schools reported using them for purposes other than searching (79%). The additional uses included computer science courses, library functions, programming classes, and administrative functions.

The online student appeared to be accessing the major database vendors through a variety of networks, with Telenet (69%) and Tymnet (47%) leading the way. Uninet and Dialnet were used by 35 percent and 29 percent of the respondents, respectively, while only 7 percent reported ever using direct access.

The student using online services was most likely to have used the DIALOG system (56%), with other major vendors represented in the following order: BRS—40 percent; WILSONLINE—18 percent; CompuServe and The Source—less than 15 percent. While these responses were predicted, an interesting finding was that 20 percent of the respondents used local databases not available through major vendors. These included several systems available in the respondent's state locale.

The three largest vendors of online services to schools offered special programs and assistance to school-based providers. Responses to the survey for vendors indicated that all had specific staff members responsible for school online programs. These contacts are listed in Appendix B. While respondents to the school library media specialist survey did not indicate that they had worked with vendors on such special programs, these programs are likely to expand as the school market expands. Some of the vendors' offerings are listed below.

All three major vendors—BRS, DIALOG, and WILSONLINE—reported that they had, or would soon release,

materials and teaching aids specifically designed for the school market.

BRS offered BRS/Educator, an online database search service discounted for K-12 educators using ERIC, Psychological Abstracts, and others. They also offered BRS/Instructor, i.e., discounted passwords for teaching students to search online on BRS. Special workshops for school library media specialists and a directory of individuals teaching online and willing to share experiences were also reported by BRS. Finally, instructional materials for individuals teaching BRS searching were under development at the time of the survey.

DIALOG Information Services also reported offering reduced rate passwords for student searching; special workshops for school library media specialists and a bulletin board for them on DIALMAIL were planned for the school market; and a specific set of materials designed for high school use was introduced in 1986. At the time of this analysis, the new classroom program, Classmate, was being tested, and a new slide presentation and teacher's manual were planned.

H. W. Wilson's WILSONLINE, the most recent entry among the major vendors, planned to introduce special teaching materials in the near future, and had already offered reduced rates for secondary school use, and special workshops and seminars for the interested school library media specialists. Online searching curriculum materials were under development by Wilson.

The three major vendors have sponsored innovative programs and research on online searching in schools on a school by school basis. Their sponsorship has ranged from reduced rate searching or free search time to grants-in-aid. It is clear that the vendors perceived the school market as a valuable and expanding audience for their products and services. User cordial systems and after-hours systems, promoted as being designed for the end-user searcher, were used in fewer than 10 percent of the respondents' facilities. Gateways and front-ends, which enable the user to search more easily through menu-driven or translated search languages, were used by only 4 percent of the respondents. One fourth of the respondents to the survey saved searches to disk (downloaded searches) (26%), and did so to save the cost of printing offline or to reuse search output later on.

Less than half of the respondents reported using search aids, and those who did most often used vendors' brief database descriptions, e.g., DIALOG's "blue sheets." Few reported using database producer-generated printed materials.

The online student in 1986 was most likely to use online to research topics in science, technology, or social science. This may have been a reflection of the currency of topics being searched, or the fact that projects and other research rather than text-based assignments were given in science and social science classes, or the multi-conceptual nature of the search topics that made online the more appropriate approach.

Topics of student searches varied widely. The most apparent finding from the question on the "most heavily searched topic" was that current topics—i.e., timely and recent topics—were the most heavily searched. A listing of some of the responses is included as Table 5.

The online student was likely to have used Magazine Index (39%), ERIC (38%), one of the news services, or PsychInfo (less than 10%). Other databases cited ranged from WILSONLINE's Readers' Guide (RDG) to highly scientific and technical sources such as Mathfile, BIOSIS, and Medline. A summary of the databases listed is presented in Table 6. This survey confirmed the importance of a small number of databases for the school audience. The minor differences in the databases reported here and in the published literature may be attributed to the increased availability of additional vendors and online resources, as well as the growing sophistication of school library media specialists using online.

It appears, then, that the online student of 1986 was searching a few databases to meet the needs of specific courses, with limited search facilities and few policies governing the management of the search process. In all but a few cases, the impetus for searching, and instruction in searching, was provided by a school library media specialist. Who were those library media specialists and where were they providing their services?

Demographics of online search providers

The online providers who introduced the student to online services in 1986 were most often state certified school

Table 5. Topics of Online Searches in 45 Schools

Social Sciences	Science and Technology
Current events (6)	Computer-related information (5)
Drug Abuse (2)	Health-related topics
Teen pregnancy (2)	Inhalation therapy
Suicide	Anorexia
Psychology of adolescence	Burn treatment
Education	Organ transplantation
Drug intervention	AIDS
Demography	Sexually-transmitted diseases
Current social issues	Alzheimer's Disease
Drunk driving	Sports medicine
	Environmental issues
	Toxic waste
	Pollution
	Math
	Math Anxiety
	Automobile design & engineering
	Biology
	Robotics

Table 6. Databases Frequently Searched in 45 Schools.

Number of times mentioned*	Database name*
26	ERIC
5	UPI News
5	PsycINFO
4	Abstrax 400
4	Dow Jones News Service
4	Books in Print
3	Biosis
3	Reader's Guide
2	Medline
2	Mathfile
2	BioInd
1	(25 additional databases)

Note: Total number of databases mentioned = 37.

*Respondents were asked to list the three most frequently-used databases in their schools. The fact that many listed one or two databases accounts for the listing of only 37 titles and 87 mentions.

library media specialists with masters degrees (70%) or bachelor degree librarians with certification (12%). The school library media specialists responding to the survey were between 31 and 50 years of age (67%), and were willing to communicate with others about their online experience in schools (91%).

The respondents to the questionnaires indicated that the online student in 1986 was as likely to be from the middle

west as from the northeast, and as likely to be from a rural as an urban setting. Responses were received from all regions of the country, although the degree of response from each state depended upon the state level school library media supervisor's awareness of programs within the state where online services were offered. At minimum, it is posited that online in the schools is not a regional phenomenon, and that it is a service of interest to those who have pioneered in offering online information and to those who plan to offer the services in the near future.

THE ONLINE ENVIRONMENT: A SUMMARY

Although online searching in the school environment is not broadly reported in the literature, it is a growing topic of interest in schools across the country. Both the 1986 survey (as reported in the preceding chapter) and a review of the literature point to its importance for this audience. The survey identified particulars of policy, practices and the demographics of searching: who was searching; who was making decisions about the level of support; and the practices that were in operation in regard to search systems selected, equipment being used, and databases searched.

While the survey was of current practice in 1986, the literature review covered a broader period and included experiential accounts of online providers in the schools, limited research that focused on school experiences, and prescriptive advice to the field.

The findings of the three major sections of the survey are presented below in the context of what the literature review indicated. Only findings that can be supported by the overlap of the two types of evidence are noted.

The people

- The literature and the survey indicate that both students and school library media specialists act as searchers. Where students do searching, it appears to be students with special status that are given this opportunity. This special status includes participation in an honors class, identification as gifted and talented, or enrollment in an advanced placement program. Instances of teachers and administrators doing their own searching are infrequent, although the survey indicated that ample instructional opportunities are available for them to learn online searching.
- It is apparent from both the literature and the survey that school library media specialists learn how to search in a variety of ways, including formal courses, vendor training, and self study.

- Students are using online for class related projects and papers.

The policies

- There is little evidence in the literature on the establishment of policies for online access. This may be due to the age of the literature and the fact that it reflects the experience of the pioneers—those who first reported their experiences based upon initiation of online service and application of *ad hoc* policies. Where policies are discussed in the literature, it is from the prescriptive standpoint and often offered by those familiar with practice and policy in other environments.
- Where the survey did address policy issues (including financing, record keeping, and evaluation of searches and search services), the major finding was that policies ranged widely among search service providers. This also reflects the newness of online services in the school environment. For example, 50 percent of the schools reported no formal mechanism for evaluating student searches, and more than 25 percent of the respondents reported that no logs of online activity were kept. Both the experiential literature and our survey indicate that online searching has not yet achieved the status of a budget line in most school library media centers.

The practice

- In looking at actual use of systems, databases, and equipment, the survey results confirm the findings from both the experiential and the prescriptive literature. Most users are using microcomputers as search terminals, which reflects the fact that online providers in schools entered the online world after microcomputers were available. Apple equipment is widely used in schools, reconfirming Apple's active role in capturing the early educational market.
- The telecommunications networks and database vendors discussed in the literature are the ones reported in the 1986 survey of practice. Tymnet and Telenet were the most frequently used networks; DIALOG and BRS were the most used search service vendors. The survey indicated

that WILSONLINE was beginning to have an impact on the school market; its relatively recent entry in the online world was responsible for its limited mention in the experiential literature.

- There is clear evidence as to which databases receive the most use in the school setting. The most frequently used, as identified in both the survey and the literature review, are Magazine Index, ERIC, Abstrax 400, and BIP, together with various news sources.

Future scenario

A synthesis of the literature and the 1986 survey point to the following:

- Online service in school settings has arrived and is at a point of rapid expansion. The rapidity of expansion is demonstrated by the fact that 71 online providers in schools were identified by state level supervisors in 33 states in 1986, just six years after the high school in Radnor, Pennsylvania, obtained the first instructional password for teaching secondary students to search online from DIALOG. The survey results reported in the previous chapter are based on responses received from 45 school library media specialists involved in online service at the secondary school level. Although the more recent literature does not document the rate of expansion since that time, more and more articles and guides for library media specialists who wish to implement online services in secondary schools are being published, as well as program descriptions and evaluations of these programs. A study exploring the feasibility of teaching elementary school students to use an electronic database searching system (Teague, Teague, & Marchionini, 1987) provides another indication of the growing interest in this area.
- Although only a small number of printed resources exist to support instruction in this area, the school library media specialist can anticipate the development of commercially produced materials as more of the major database vendors, producers, and publishers realize the economic potential of this market.

- The range of information services and their management in the school setting will undergo considerable change in response to the initiation of online services.
- Online services as reported in the literature review and our survey of practice may be a transient technology; the availability of databases on CD-ROM, the possibility of shared disks, and the continuing need for currency must all be considered as schools plan for the provision of information to students, teachers, and administrators.

The following chapter suggests materials that can be consulted by school library media specialists who want more detailed information on introductions to the subject, recent texts, instructional guides, accounts of practice, and management suggestions and advice.

References

Teague, Marianne, Teague, Gerald, & Marchionini, Gary. (1987). "Exploring the Use of Electronic Information Services with Elementary Students." *Education & Computing* 3 (3-4), 179-184.

THE ONLINE GUIDE: A PATH TO PUBLISHED RESOURCES

This locator is designed to help educators, school media specialists, and administrators identify materials that address the topic of online bibliographic searching in the school environment. The materials presented range from general introductions to the subject to accounts of actual online searching programs in schools with suggestions for practice. Materials are grouped in the following categories: introductions to the topic; recent texts and instructional guides; recent articles about online searching in schools; accounts of practice by school media specialists; and management suggestions and advice. Abstracts are provided to highlight substantive information considered particularly useful to readers of this guide.

The materials suggested below are limited to publications that have appeared within the 1980s. This order of currency was selected for two reasons: (1) retrieval systems have been refined to such an extent as to outdate older publications, and (2) developments in the school library media area have only been reported since the early 1980s.

Introductions to the Topic

Caputo, Anne S. (1985). "Online Goes to School: Instruction and Use of Online Systems in Secondary and Elementary Education." In *National Online Meeting Proceedings (New York, New York, April 30-May 2, 1985)*. Medford, NJ: Learned Information, 1985.

A representative of Dialog Information Services and Catholic University of America, Caputo discusses both the special opportunities and special problems for online services, database suppliers, and educators which are presented by the use of online systems by secondary, intermediate, and even elementary school students. Possible benefits to the online and educational communities in making databases available at or below cost for student use are discussed, as well as some real or potential problems encountered in school use of online and some considerations for future needs and opportunities. Benefits cited include the development of research and problem solving skills, logical problem

solving skills, good research skills and respect for information organization, and awareness of information sources, together with the creation of closer ties between the classroom teacher and the librarian or media specialist. Barriers are identified as cost; the need for more instructional materials for this audience and more qualified instructors; and the possible creation of competition and conflict rather than cooperation between the media center and the teaching staff. A discussion of unfinished business makes suggestions for developing materials and training instructors, and notes opportunities for the development of front-end or gateway software and further research. Caputo concludes by pointing out that one of the important benefits of online instruction is the opportunity for greater integration of library or media center activities into the school curriculum.

Dowling, Karen. (1984). "Online Searching and the School Media Program." In Shirley L. Aaron and Pat R. Scales (eds.), *School Library Media Annual, 1984*, vol. 2, pp. 425-435. Littleton, CO: Libraries Unlimited.

An introduction to the concept and advantages of online bibliographic searching with suggested steps for introducing it into the school library media center. Advantages pointed to are speed, quantity of available records, cumulative and comprehensive nature of databases, and access to information not available in print form. Steps for introducing the online service include: (1) choosing communications software for the microcomputer, with consideration of automatic dialing and data storage, buffer capacity, column displays, speed of transmission, and on-and-offline printing capability; (2) choosing a search service to suit the needs of the school media center, with attention to the history of what works well in schools (e.g., DIALOG, BRS, The Source, and CompuServe) and such factors as available databases, cost (both fixed and ongoing), customer support services, and training and technical assistance; (3) arranging for training, which is available from vendors, library schools, database producers, professional associations, and online user groups (the possibility of in-house training from media specialists within a district who have previously received online instruction should also be considered); and (4) introducing the system to staff by demonstrating the microcomputer's various applications (such as filing and word processing),

and to students, both as part of a general orientation to the media center and as part of a unit approach to library skills instruction. This chapter also identifies one school system's most frequently searched databases: ERIC, Magazine Index, Medline, Biography Master Index, Biosis Previews, MLA Bibliography, and Historical Abstracts, with usage reflecting a relationship to the areas of science, English, and social studies. A resource path finder and sample searches in DIALOG are also provided.

Gordon, Helen, (ed.). (1987, May). "Planting the Seed... Online in Schools." *Online* 11 (3), 15-36.

Eight articles on various facets of online in school are featured in this issue of *Online*: (1) "Online Users in Schools: A Status Report," by Elizabeth Smith Aversa and Jacqueline C. Mancall; (2) "Online at Radnor High: A Pattern of Change," by Elyse Evans Fiebert; (3) "Online at East Lyme (CT): Dow Jones Gets High Marks," by Eugene A. Lynch; (4) "The Rutgers Prep Experience," by J. Andrew Walcott; (5) "LIN-TEL in Pennsylvania: The BRS Connection," by Doris M. Epler; (6) "CLASSMATE to 2100: DIALOG at Montgomery Blair," by Erica K. Lodish; (7) "From Bulletin Boards to Boolean: Using Online To Teach Online," by Karen Dowling and Ellen Pruitt; and (8) "Online in Schools: A Selected Annotated Bibliography," compiled by Ann Lathrop and the library staff of Salem-Keizer High School.

Mancall, Jacqueline C. (1984, Winter). "Training Students To Search Online: Rationale, Process, and Implications." *Drexel Library Quarterly* 20 (1), 64-84.

Mancall argues that students will need to know how to locate the information they need regardless of the format in which it has been stored, and that a new set of information skills will be required if they are to be able to maximize their eventual use of the computerized information storage systems now coming into use in such settings as the automated office. She then describes the online process and provides a brief discussion and an example to illustrate the basic idea of an online search and the potential advantages and disadvantages of students going online. The illustration follows a student through the process of narrowing the general topic of solar energy to a limited, researchable

topic—the costs of solar energy for residential use—and developing a search profile by selecting search terms and determining the appropriate Boolean operators to be used. A five-step process approach for use in working with students is then outlined: (1) negotiation of the topic to be searched; (2) helping students transform the topic statement into search statements that can be handled by an online system; (3) choosing searchable terms; (4) assisting students in preparing a search strategy; and (5) working with students when they are online. The online search of the Energyline database for information on the topic described above is reproduced with explanations for the nine steps that led to an examination of the titles retrieved, revisions of the strategy based on those titles, and the examination of the abstracts of the most relevant documents identified by the search. Problems with locating the documents referenced in a search are considered as well as the evaluation of the student's final results and keeping records of online activities and expenditures. Advantages and disadvantages of online searching are listed, and the major implications for school library media programs of training students to search online are briefly reviewed for the areas of student instruction, collection development, and service goals.

Tenopir, Carol. (1986, February 1). "Online Searching in Schools." *Library Journal* 3 (2), 60-61.

Provides an overview of the status of online searching in schools and identifies some that offer online searching programs. Tenopir indicates that DIALOG, BRS, and Wilsonline are actively targeting the school library market. All three offer discount rates for instructional purposes and are now marketing online curriculum materials, such as teacher's guides, student activity sheets, and user manuals. Also available are search software packages and database subsets on floppy disk, such as ERIC MICROsearch and Microcomputer Index on Disk (MIND), which teach searching to students before they gain access to full databases. Tenopir discusses the benefits of online searching in schools, including the enhancement of students' logical thinking and problem solving skills, awareness and use of a wide range of information accessed online, and increased cooperation between classroom teachers and school librarians fostered by this approach to information skills.

Williams, Martha E. (1985). "Databases, Computer-Readable." In *ALA Yearbook of Library and Information Services, 1985*, pp. 110-113. Chicago, IL: American Library Association.

An overview of the industry for readers interested in the state of online searching beyond the school media center environment. Williams, a chronicler of the online industry since its inception, indicates current trends in the use of computer-readable databases and provides statistical information on databases used and software packages and features available. Williams attributes the 20-25 percent increase in online database usage to the proliferation of front-ends, gateways, and intermediary systems. Of the 16 world-oriented database vendors, two—Mead Data Central (MDC) and DIALOG—claim 71 percent of *all* usage and 85 percent of library and information center expenditures for online database access. The average expenditure per hour for all features of online service is reported as $117, ranging from $33 to $272, with MDC and DIALOG averaging $160 and $113 respectively. Of the more than 300 databases used, five—LEXIS, MEDLARS, CA SEARCH, ERIC, and NEXIS—yielded over 500,000 hours of online use per year.

Recent Texts and Instructional Guides

Borgman, Christine L., Moghdam, Dinah, and Corbett, Patti K. (1984). *Effective Online Searching: A Basic Text*. New York, Marcel Dekker.

Intended primarily for search intermediaries who accept questions from clients and perform the searches, this text includes sections on interviewing the client and evaluating client satisfaction as well as on the principles of searching. Detailed discussions of search strategy development, databases, vocabulary control, and evaluation of searches are provided together with step-by-step instruction in searching techniques. Exercises included for each of the five chapters that develop searching techniques are designed for searching on DIALOG Information Services, System Development Corporation's ORBIT system, or Bibliographic Retrieval Services (BRS). These systems are discussed generically for use with current system manuals to provide the most up-to-date training materials. Designed as a text for library school students, practicing librarians, information specialists, and researchers, the text is suitable

for graduate and undergraduate courses or as a self-teaching handbook when used with system manuals.

Cabonell, Martha et al. (1981, Summer). "Online Training Sessions: Suggested Guidelines." *RQ* 20 (4), 353-357.

Developed for the Reference and Adult Services Division of the American Library Association, this document delineates guidelines for planning and organizing an online training session and is appropriate for two audiences: those individuals who need guidelines for evaluating specific training opportunities, and those who intend to prepare online training sessions and courses. Five types of available training sessions are described: (1) Search Service—Beginning; (2) Search Service—Advanced; (3) Search Service—Subject; (4) Database Producer; and (5) Independent Introductory Workshop. A search service provider is one who provides training on a system through which searchers gain access to particular databases. Database producers compile and provide individual databases to the search services and their training focuses on the use of a particular database. Independent workshops are presented by individuals, libraries, library schools, or commercial information companies. Sliding-scale cost-consideration guidelines for minimum, suggested, and optimum levels of presentation are prescribed for 16 factors in each type of training. These factors include audience level and size; length of session; trainer's experience; terminals and phone lines; other equipment (e.g., blackboard, overhead projector); additional handouts (copies of transparencies, workbooks); resources (vendor manuals); online time for demonstrations, individual, and post-session use; type of presentation; registration and publicity; location/facility; evaluation; and follow-up.

CLASSMATE Student Workbook. (1987). Palo Alto, CA: DIALOG Information Services, Inc.

This student workbook presents materials for use by students in learning to search online using DIALOG's KNOWLEDGE INDEX service. The first four units focus on basic techniques: "Introduction to Online Searching," "Planning Your Search," "Using KNOWLEDGE INDEX Search Commands," and "Performing an Online Search." Units on advanced techniques address "Locating Articles by

a Specific Author," "Locating a Specific Publication," "Locating Other Information," and "Individual Projects and Online Searching." Each unit includes a statement of the goal and objectives, a list of terms to know, explanations of the material to be covered, class activities, and an assignment. A variety of illustrations and diagrams are provided as well as a glossary and an index.

CLASSMATE Teaching Guide. (1987). Palo Alto, CA: DIALOG Information Services, Inc.

This guide contains an overview of the flow of instruction and the topics to be covered in the eight modular units of the course; an outline of each unit including a step-by-step instructional sequence; page references to the accompanying student workbook; references to supporting documents and appropriate transparencies; an instructional materials list and additional technique notes; suggested test items with answer keys; and copy masters for student activities, overhead transparencies, search worksheets, and a certificate of achievement. The first four units cover the preliminaries of online searching using DIALOG's KNOWLEDGE INDEX service. The four units in the second group present some more advanced techniques used when doing author, journal name, and date searching. The teaching-learning activities outlined in this guide include an introductory videotape presentation; readings/lecture from text material; individual and group in-class activities; assignments that involve library work and search planning; guided online practice for individuals or groups; and group discussion.

Fenichel, Carol H. and Thomas H. Hogan. (1984). *Online Searching: A Primer*, 2nd ed. Medford, NJ: Learned Information.

A general primer for students of information science and those in the field of library science, communications, and database publishing. Focus is on bibliographic database searching, but an overview of numeric and non-bibliographic databases and a section on future prospects are also included. Chapters 1-4 view the online industry and three types of organizations involved: vendors (such as DIALOG, BRS, InfoServices, SDC, NLM, The Source, Dow Jones, CompuServe, and Mead Data Central), database producers,

and user groups. Chapter 5 presents the mechanics of searching as a way of understanding its power. Chapters 6-11 discuss equipment, the reference process, costs and charging policies, training, and other administrative considerations. Chapters 12 and 13 introduce non-bibliographic databases. The book provides a glossary, selective bibliography, and appendixes covering the areas of large databases, networks, and vendors, professional online associations, lists of consultants, brokers and networks, and equipment manufacturers.

Harter, Stephen P. (1986). *Online Information Retrieval: Concepts, Principles, and Techniques*. New York: Academic Press.

The first of nine chapters discusses information retrieval as a communication process between an information seeker and an information store with a professional intermediary as a possible third party. The remaining chapters examine: (1) the nature of languages as they affect the communication process, including natural languages, controlled vocabularies, system command languages, and citation indexing "languages"; (2) the conceptual framework of databases, including file structure, sort sequence, parsing rules, and the search process using Boolean logic, word proximity, and truncation; (3) characteristics of reference databases and principles for their evaluation and selection; (4) the online search process as an intellectual activity and relevant research; (5) evaluation of search output from the perspective of the end-user, searcher, and search system; (6) overall strategies or approaches to searching; (7) source databases; and (8) important trends, problems, and issues, including the use of microcomputers, gateway systems, and end-user search systems; legal issues; and the responsibilities of professional search specialists.

Humphrey, Susanne M. and John Biagio Melloni. (1986). *Databases: A Primer for Retrieving Information by Computer*. Englewood Cliffs, NJ: Prentice-Hall.

A basic "how-to-do-it" primer for an end-user. Effective approaches for both the information science professional and the general reader are suggested in the section entitled "How to Use This Book." Examples drawn from hypothetical models display many of the features of a variety of

systems. Chapter 1 highlights the significance and advantages of computerized information retrieval. Chapters 2 and 3 talk about how information is stored and organized for non-computerized retrieval, emphasizing the difficulties of manual manipulation of records. Chapter 4 is a general discussion of the organization and maintenance of computerized information. Chapters 5-12 detail the basic principles and practices of online retrieval using hypothetical models not specific to any one existing system. Chapter 13 examines relationships among users, retrieval services, database suppliers, and telecommunications networks. Chapter 14 discusses user friendliness, command languages, and search formulation, and Chapter 15 explores the impact of microcomputers on retrieval as it affects the form, transmission, and organization of information. Chapter 16 is an extensive checklist which provides practical criteria for selecting a retrieval service.

Meadow, Charles T. and Cochrane, Pauline Atherton. (1981). *Basics of Online Searching*. New York: John Wiley.

A general introduction to the concept of online searching that would be useful for initiating educators and administrators unfamiliar with the topic. Sample records are given for each type of database: bibliographic, directory, numeric, full text, and knowledge. A basic explanation of the function of Boolean logic operators is presented, and sample searches, examples of budgets, and a list of information sources are provided.

Motomatsu, Nancy R. and Newman, Joan. (1987, September). *Research Goes to School: Teaching Students To Go Online. Revised.* Olympia, WA: Washington Office of the State Superintendent of Public Instruction, Division of Instructional Programs and Services. (ERIC Document No. ED 288 531).

Designed to assist teachers in teaching introductory courses in searching online databases at the adult or secondary level, this manual discusses very basic searching techniques and strategies and is intended to stimulate further study rather than teach in-depth searching skills. Examples in the manual are taken from databases in the Bibliographic Retrieval Services (BRS) system and Datatimes. The ration-

ale and objectives for instruction are presented; the ERIC, Magazines (MAGS), and Datatimes databases are introduced; factors to be considered before going online are discussed; and specific procedures for going online with BRS and Datatimes are detailed. In addition, complete sample searches on six topics are presented, and sample school budgets are provided as well as materials from eight online programs in Washington State. A glossary and a 22-item bibliography on student searching are also provided. Six appendixes include a listing of Washington State online searching consultants for K-12; examples of Boolean logical operators; a listing of the names, labels, and producers, and descriptions of databases available on BRS as of February 1987; a summary of BRS commands, logical operators, and print options; a listing of journals indexed in Magazine Index; and 20 additional search strategies.

Parisi, Lynn S. and Jones, Virginia L. (1988). *Directory of Online Databases and CD-ROM Resources for High Schools.* Santa Barbara, CA: ABC-CLIO.

Designed to help students select the most appropriate database(s) to retrieve information for assignments for social studies, science, and English classes, this directory provides descriptions of the databases most relevant to the high school curriculum. Instructions for accessing the databases and information on their cost are included.

Schrader, Susan. (1985). *A Curriculum Guide for Online Database Searching with High School Students.* Ankeny, IA: Heartland Education Agency. (ERIC Document No. ED 256 373).

A brief curriculum guide designed to help educators who have received online search training introduces the concept of online searching to high school students. Goals for online programs are suggested, including: to refine students' thinking skills through strategy formulation; to create enthusiasm for the research process; to prepare students to function in the information society; to broaden awareness of the range of materials available in other library collections; and to introduce students to a new technology. Specific course objectives suggested are to enable students to understand the process of online database searching; describe the relationship between Boolean logic and database organiza-

tion; distinguish databases appropriate to a topic; separate a research topic into key concepts; expand or narrow a topic using related terms and synonyms; and retrieve documents from sources outside the school media center. Activities, a student worksheet, and sample searches are included.

State Library of Pennsylvania. (1985). *Pennsylvania Online: A Curriculum Guide for School Library Media Centers*. Harrisburg, PA: Pennsylvania Department of Education, Bureau of the State Library, Division of School Library Media Services. (ERIC Document No. ED 264 887). [Note: a revised edition is scheduled for publication early in 1990.]

A curriculum guide prepared by a selected group of Pennsylvania educators to assist school library media specialists in introducing and teaching online bibliographic database searching. The curriculum suggested is arranged in four sections: (1) information in society; (2) developing a search strategy; (3) conducting a search; and (4) record keeping and evaluation. Scope and sequence charts are included which indicate 27 student competencies and 41 desired student outcomes. For each course objective, content, resources, expected levels of achievement, and procedures for evaluation are specified. Some objectives are also supported with lesson plans. A section on online management discusses budget and cost factors, vendors, gateway software, telecommunications, copyright, security, and record keeping. An annotated bibliography, sample budget, sample search, and lists of telecommunications networks, vendors, and commonly used databases are included.

Wilks, Brian B. (1988). *What Every Librarian Should Know about On-Line Searching*. 2nd ed. Ottawa, ON: Canadian Library Association.

The first of four chapters in this completely rewritten and updated second edition reviews the development of computerized information retrieval and provides a brief look at its future prospects. Communicating with the computer is addressed in the second chapter, which covers Boolean Logic and online commands both in general and for individual search systems, including both the daytime and the evening services. The third chapter covers the reference interview and provides examples of the development of search strategies and online searches for seven topics. Each

of these examples illustrates the process for a different online system. Costs of computerized information retrieval are addressed in the fourth chapter, including the costs of hardware and software; online training, workshops, manuals, and vendor-developed software for online searching on the individual search systems; database aids; and periodicals on online searching. A glossary and an index are included.

Journals That Publish Articles on Online Searching in the School Setting

Catholic Library World
Catholic Library Association
461 West Lancaster Avenue
Haverford, PA 19041
Bimonthly, $35.00.

Classroom Computer Learning
Peter Li, Inc.
2451 East River Road
Dayton, OH 45439
Monthly, $22.50.

Electronic Learning
P.O. Box 2041
Mahopec, NY 10541
8/yr, $19.95.

Library Journal
R. R. Bowker Co.
P. O. Box 1427
Riverton, NJ 08077
20/yr., $67.00.

Online
Online, Inc.
11 Tannery Lane
Weston, CT 06883
Bimonthly, $85.00.

Online Review
Learned Information, Inc.
143 Old Marlton Pike
Medford, NJ 08055
Bimonthly, $78.00.

Online Searcher: A Newsletter for Teaching Online Searching in Education
Pam Berger
14 Hadden Road
Scarsdale, NY 10583
Quarterly, $24.00.

School Library Journal
R. R. Bowker Co.
P. O. Box 1426
Riverton, NJ 08077
10/yr., $54.00.

School Library Media Activities Monthly
17 East Henrietta Street
Baltimore, MD 21230
Monthly except July and August, $44.00.

School Library Media Quarterly
American Association of School Librarians
American Library Association
50 East Huron Street
Chicago, IL 60611
Quarterly, $30.00.

Bibliographies Covering Online Searching in the School Setting

Lathrop, Ann. (1987, May). "Online in Schools; a Selected Annotated Bibliography." *Online* 11 (3), 33-36.

Lathrop, Ann. (1985, July). "Online Information Databases in Secondary School Libraries." *Apple Library Users Group* 3 (3).

Lathrop, Ann. (1985). "The Use of Online Information Databases in School Library Media Centers." In *Pennsylvania Online: A Curriculum Guide for School*

Library Media Centers. Harrisburg, PA: Pennsylvania Department of Education, Bureau of State Library, Division of School Library Media Services. (ERIC Document No. ED 264 887). [Note: a revised edition is scheduled for early in 1990.]

Recent Articles on Online Searching in the School

The following articles report on *studies* of online searching in the school environment:

Aversa, Elizabeth. (1985, Summer). "Teaching Online Searching: A Review of Recent Research and Some Recommendations for School Media Specialists." *School Library Media Quarterly* 13 (3-4), 215-219.

This paper reviews the findings of formal studies and experiential accounts of teaching online searching and, on the basis of past research, recommends guidelines for the school media specialist designing a curriculum in online searching. The research and reports on which the recommendations are based originate in studies of five types of online training: (1) vendor training; (2) database producer training; (3) course-based training for credit in library schools and other academic programs; (4) self-instruction in online searching; and (5) locally designed training programs prepared for a particular audience.

Barlow, Diane, Karnes, Brenda, and Marchionini, Gary. (1987, November). "CD-ROM in a High School Library Media Center: A Research Project." *School Library Journal* 34 (3), LC66-LC72.

Describes the experiences of high school students using microcomputers to access an electronic version of Grolier's *Academic American Encyclopedia* in the school's library media center. Problems created by the lack of standardization of hardware and software for CD-ROM are discussed as well as the configuration of a CD-ROM system, providing physical access to the system, costs, and security. Observation of students using the system showed no clear preference for either of the two information seeking modes—browse or full-text search. Although the ability of the students to successfully construct a search strategy using combinations of key words or phrases appeared to be limited, they were successful in finding information using

informal, heuristic searching. A brief introduction to the encyclopedia was given to students participating in the study, including a demonstration of the two search modes using as an example a search that been attempted in the print encyclopedia. Students unfamiliar with the computer were also given some instruction on the use of the keyboard. It was concluded that high school students can use this information resource successfully with a minimal amount of training, and that the full-text environment and generic nature of the encyclopedia promote a highly interactive browsing behavior which overcomes the difficulties students experienced with Boolean operators.

Beck, Jean C. (1984). "Information Technology for Schoolchildren." *IFLA Journal* 10 (2), 145-150.

This article describes how two British research projects contributed to the understanding and utilization of new information technology by school children. The 1980 Microelectronics Education Programme (MEP) assisted in equipping schools with the new technology, developed educational programs and materials for the microcomputer, trained teachers to use these resources in the curriculum, and supported curriculum development. In 1979 the Schools Information Retrieval (SIR) project developed a microcomputer system using a command language and inverted files for use by secondary school students. The objectives of the project were to assist third year science students in their search for information for schoolwork; to demonstrate in a practical way the principles of modern information retrieval; and to help students develop the skills and understanding to function effectively in an information society. The two-year SIR project produced four recommendations for implementing an online curriculum component in secondary schools: (1) introduce the principles of online searching to younger, first year students; (2) allow students to create their own databases to ensure their understanding of the concepts and organization of online databases; (3) introduce students to a database with a different type of organization, such as a larger or hierarchical one; and (4) implement SIR across curriculum, age, and ability ranges.

Callison, Daniel. (1988, Winter). "Methods for Measuring Student Use of Databases and Interlibrary Loaned

Materials." *School Library Media Quarterly* 16 (2), 138-142.

Based on the online experience of 41 high school juniors in Carmel, Indiana, the author developed a formula for determining student use of materials identified through their searches, and the use rate of materials borrowed through interlibrary loan networks. Callison summarizes findings of prior use studies and describes his own study, which compared bibliographies from papers written by two student groups at Carmel: a 1985 group which did not have online access, and a 1986 group which reached searched WILSONLINE using WilSearch software. Differences were noted as to the kind and currency of journals cited in the students' papers: (1) the WilSearch group used 29 titles not found in the non-online papers; (2) 71 percent of the WilSearch citations were three years old or less, compared to 47 percent of those from the 1985 group; (3) the 1986 papers cited more different sources and contained more footnotes than the papers from the previous year; and (4) the 1986 papers showed a surprising increase (60%) in the number of newspaper articles noted. However, Callison concedes the currency of materials identified online may be due to the currency of the database (only two to three years retrospective), and the fact that online students tended to choose more current affairs topics for their research.

The author devised a formula for identifying *key sources*, i.e., titles which were most frequently cited for a particular information format. Identification of such key materials is helpful in developing the school media center's collection.

Callison also explored the effects of interlibrary loan (ILL) procedures on student use of materials requested. Of the 101 book citations identified through WilSearch, 46 were requested through ILL, 18 (39%) arrived in time for use in the students' assignments, and 13 of the 18 were eventually cited in the papers. Of 440 periodical citations identified online, 138 (31%) were requested, 115 (83%) were located in time for use, and 28 of the 115 were actually cited. Factors contributing to this low use rate could be the already high return the students got from books and other materials obtained locally, the dependence upon interlibrary loan (ILL) for titles not housed in the school collection, and the lengthy turnaround time for ILL requests.

Craver, Kathleen W. (1985, Winter). "Teaching Online Bibliographic Searching to High School Students." *Top of the News* 41 (2), 131-136.

Describes the introduction of online bibliographic searching to four classes of 67 college-bound high school seniors involved in a common research assignment. The methodology combined classroom instruction with direct observation of student searching behavior. The two-year program was designed to help students understand what online searching is, become familiar with its terminology, be aware of the variety of available databases, recognize the value of indexes and thesauri as tools for formulating search strategy, form their own strategy, observe their strategy being performed by a skilled searcher, interpret bibliographic records, evaluate the results of the search, and be cognizant of the advantages and disadvantages of online searching. Evaluation of the course was based on analysis of a 10-question evaluation form, a posttest (provided with the article) which tested students' understanding of terminology, database selection, search strategy and citation reading, and observation of the searches themselves. Ninety-seven percent of the students said the material was presented in an understandable way, over 90 percent reported they could interpret an online bibliographic record, and 90 percent scored 80 percent or higher on the posttest. Although students reported satisfaction with the online experience, they suggested that they would prefer to perform their own searches, and also recommended that the course be introduced in the fall of the academic year, rather than winter, to allow adequate time for the retrieval of documents.

Craver, Kathleen W. and Ounanian, Lee Allison. (1984, June). "An Introduction to Online Bibliographic Searching for High School Students: A Successful Approach." *Educational Technology* 24 (6), 39-41.

Describes how two classes of high school students were introduced to the concepts of online bibliographic searching; were taught to formulate their own search strategies; and were given the opportunity to observe the execution of their searches by a skilled searcher on various selected databases. It also examines and evaluates the methods employed and the students' achievement level responses to the course. Thirty-four high school students, all college-

bound seniors, participated in the course as part of research preparation for the following debate topics: (1) capital punishment; (2) censorship in education; (3) conventional arms sales; (4) defense spending budget; (5) genetic engineering; (6) gun control; (7) insanity plea; (8) socialized medicine; and (9) voluntary, active euthanasia. Groups of four to five students were assigned one of these topics with affirmative negative positions designated. Research began in September, and the course in online bibliographic searching was taught in January. The main purpose for teaching the course was to introduce students to a library service which would enable them to do research more quickly, and also to provide them with information pertaining to their assigned debate topics. Once their search strategies were completed, students were allowed to select from a large group of databases, and they began narrowing their research topics to isolate the bits of information they still needed for their part of the debate. The databases selected by the students were Congressional Information Services, ERIC, Magazine Index, Medline, National Criminal Justice Center, National Newspaper Index, and PAIS International. At the end of the course, 85 percent of the students indicated that the course had provided them with an understandable introduction to online bibliographic searching; over 96 percent thought the material had been presented in an understandable manner; and the vast majority thought they were able to comprehend the relevant terminology and could formulate an effective search strategy. On a post-course examination, almost 60 percent of the students scored between 90 and 100 percent, while 38 percent received grades between 80 and 89 percent.

All of the students seemed to be gratified with the results, and many of them indicated that they intended to request a search for future class research assignments.

Teague, Marianne, Teague, Gerald, and Marchionini, Gary. (1987). "Exploring the Use of Electronic Information Services with Elementary Students." *Education & Computing* 3, 179-184.

Two exploratory studies were conducted to determine how well elementary students could use microcomputers to access electronic databases. The first study examined the use of an online encyclopedia by 26 gifted and talented

students in grades 2-6 to find information for written reports. All were successful, with the younger students comparing favorably with the older students in system use and information retrieval. The second study compared the efficiency and effectiveness of two additional groups of third/fourth and sixth graders using a full-text electronic encyclopedia mounted on CD-ROM. In this study, the older students were found to be somewhat more successful in coping with this more complex technology.

Wozny, Lucy Anne. (1982, Fall). "Online Bibliographic Searching and Student Use of Information: An Innovative Teaching Approach." *School Library Media Quarterly* 11 (1), 35-42.

This frequently-cited study reports on the use of information resources by ninth grade honors students who were taught to search online. The online searching component was integrated into a science project and formal online instruction was provided. The study examines student use of a variety of resources, including magazines, books, newspapers, and other formats, as well as the types of libraries they tried and where they were successful in finding information referenced in their papers. The methodology was adapted from an earlier study by Drott and Mancall which used data generated from bibliographies of student papers, student and teacher questionnaires, and an interview with the school library media specialist. In addition, this study examined printouts of student searches.

Results of the data analysis are presented in six tables covering: (1) kinds of materials students used, which shows that magazines are a preferred source of information (accounting for 46 percent of all references); (2) rank of unique magazine titles by use, with *Newsweek*, *Time*, *National Geographic*, *U.S. News & World Report*, and *Business Week* heading the list; (3) types of libraries students used and the percentage of information found in them, which revealed that 98 percent of the students tried the school library and 92 percent of those trying used the information found there; (4) references to types of materials retrieved from different types of libraries, which indicates that media specialists should suggest other sources of information beyond the media center; (5) online databases used and the percentage of searches performed on them; and (6) percentage of

records retrieved from the two most-searched databases, Energyline and Environline, as well as the types of materials referenced from them.

Accounts of Practice by School Media Specialists

Clise, Irene. (1986, September/October). "Hand in Hand: Electronic Search & Critical Thinking Skills." *The Book Report* 5 (2), 18-19.

Planning for the implementation of an electronic information service for the curriculum at Timberline High School in Lacey, Washington, was based on four assumptions: at the high school level the process and understanding of accessing information electronically is as important as the information that is received; the critical-thinking process required for online searching is an important element in the curriculum; the faculty needs to be educated along with the students; and all information obtained from searching should be free of charge to the student. The proposal for the first year provided for 25 percent of the students and 10 percent of the teachers to be involved, and presentations were made to classes on international relations, economics, psychology, data processing, speech, and diversified occupations.

More than 33 percent of the students and 18 percent of the teachers were involved in the project during the first year, and approximately $550 was spent for online charges during the six-month period. The three-hour instructional sequence included an introduction to databases and to online and telecommunications channels; a discussion of search strategies, key words and examples followed by practice in writing search statements; and an online session with students to demonstrate the effectiveness of their statements and the kind of information they would find. Online time was then scheduled for the classes. During the second year, students in classes that required the most up-to-date information were taught to go online independently. The project has been received enthusiastically by both students and teachers.

Dowling, Karen and Pruitt, Ellen. (1987, May). "From Bulletin Boards to Boolean Using Online To Teach Online." *Online* 11 (3), 31-33.

When online searching was introduced in Montgomery County public high schools in 1982, an inservice course was developed to meet the training needs of library media specialists. The first of five sessions (three hours each) focused on computerized bulletin boards to provide an introduction to telecommunications and communications software. Accessing the information utility CompuServe was addressed in the second session, and searching on the DIALOG databases was the topic for sessions three and four. Session five provided a look at full-text databases. This brief account of the training program includes the objectives, activities, and assignments for each of the sessions.

Epler, Doris M. (1987, May). "LIN-TEL in Pennsylvania: The BRS Connection." *Online* 11 (3), 24-26.

A statewide network, LIN-TEL (Linking Information Needs: Technology-Education-Libraries) was created in April 1983 in response to the increasing demand from the schools for online searching services. The main objectives of LIN-TEL were to make online database searchable available to students as another method of information retrieval and to integrate research/resource gathering into the school library media curriculum, to provide local educational agencies with direct access to online databases of professional literature for their own use, and to stimulate the exchange of information among school districts, intermediate units, the Pennsylvania Department of Education, public libraries, and other educational institutions. Various combinations of state and/or federal funding were provided during the first few years, and a master account was established with BRS which permits each site to have its costs deducted directly at BRS.

As online searching was integrated into the curriculum, students displayed so much interest that it was felt that some kind of recognition was needed, and the annual "Outstanding Student Searcher" contest was developed in 1985. Contests were held in the schools and librarians selected and submitted the three best to the Pennsylvania Department of Education (PDE). The three best from the state were selected by resource specialists at the PDE, and the final contest was held at the Pennsylvania School Librarians Conference where the students performed their searches while participants in the conference observed via rear screen

projection. First, second, and third place winners were determined by judges from business and education.

In 1987, 80 percent of the school sites were teaching online skills to small groups of students while the others were permitting individual students to perform their own searches. Two databases appeared to be particularly relevant to the students—ERIC and Abstrax 400—although a number of other databases were used as well. Future plans included investigating the possibility of providing access to other commercial databases; conducting an evaluation of the impact of online searching at the elementary level, which was included in the program for the first time in 1987; and evaluating the impact of CD-ROM on the LIN-TEL network. It was noted that all future plans were contingent on funding.

Kachel, Debra E. (1986, May 1). "Online Bibliographic Searching: A Pilot Project." *LJ/SLJ Library Computing, Library Journal* 111 (8), LC28-LC30.

This project followed the guidelines set forth in *Pennsylvania Online: A Curriculum Guide for School Library Media Centers* from the Pennsylvania State Department of Education. Its goals were to provide training and assistance to the school librarian, funding for online searching with the BRS commercial vendor, and a course of study for teaching online searching to students. Instruction covered terminology, database organization and content, search terms, logical and positional operators, commands, and formulation of a search strategy. The study used two forms of evaluation: (1) cost/time results; and (2) student impressions of the unit. It was found that an average manual search yielded one reference in 13 minutes, while the average online search yielded 12 sources in one minute at a cost of $12.03. The average online time per student was nine minutes, and it took approximately 28 minutes to run, save, and print each search. Students used an average of two databases, with the most frequently searched reported as Magazine Index, ERIC, MATHSCI, PAIS, SocialSCISearch, Sociological Abstracts, and Abstrax 400. Students commented that speed is an advantage in online searching, but that it is too expensive. Interlibrary loan time was a hindrance to many students, and some claimed that any previous computer experience they had was not applicable

to this unit. Videotaped searches were suggested as an aid to instruction. An overwhelming majority (96%) felt the online unit was useful and should be continued, and 79 percent felt it should be expanded into other curriculum areas.

Levinson, Michael S. and Andrew J. Walcott. (1985, September/October). "Online Databases—A School Project." *Media and Methods* 22 (1), 13-15, 57.

Describes a pilot project of online instruction and mediated searching at Rutgers Preparatory School. The students participating in the project were divided into two groups: one group, dubbed the "traditional" group, received no online instruction other than that which was normally introduced to students, and no extra assistance from teachers; the other "online" group received online training similar to that received by the faculty and help during the research process. Results of the project showed that the online group spent more time on research than their traditional counterparts, but also waited a longer time for search results. Students claimed many of the journal "hits" were too technical for them, and that they felt detached from the mediated search process. The traditional group believed the online students were having an easier time because of the individualized attention they were getting from teachers. The authors observed that student/teacher relationships were better in the online group, and suggested that online papers may have been judged as better because teachers participated in the students' searching process. A significant observation was that the traditional students formulated their topics based on available information, while the online students formulated their topics independently, then sought to retrieve relevant information.

Lodish, Erica E. (1987, May). "Classmate to 2100; DIALOG at Montgomery Blair." *Online* 11 (3), 27-31.

This article describes the integration of online searching into the curriculum at Montgomery Blair High School in Montgomery County, Maryland. Lodish offers criteria for selecting courses—and specific units within courses—to be targeted for online instruction and application. These include identifying leveled classes that all students take, and courses that offer a variety of research topics. Units are

chosen for their inherent need for analyzable data (such as statistical or demographic information), as well as the availability of controversial topics within the unit. The author describes how online instruction is integrated into the curriculum of the school's four-year magnet program for high ability students. Students are introduced to online in the ninth grade. Boolean logic is part of their geometry class, and they perform actual searches. Online instruction is intensified in the tenth grade as part of earth science and biology research projects. Juniors use online searching to refine topics to be used for their research projects. Lodish cites the following benefits of online searching instruction: increased student self-confidence and satisfaction with the online process; reinforcement of research and thinking skills; added direct involvement in the learning process; and the value of long-range planning for assignments. Media specialists and classroom teachers work together in the planning for integrating online instruction into the curriculum. Disadvantages include cost and budgeting strains, unavailability of some of the materials identified online, and the need for databases not available through DIALOG's reduced rate Classroom Instruction Program (CIP).

Lynch, Eugene A. (1987, May). "Online at East Lyme (CT): Dow Jones Gets High Marks." *Online* 11 (3), 21-23.

Advantages of using the Dow Jones News Service are cited as the very affordable rate for educational institutions; availability of 30 separate databases, including full text access to the several newspapers and journals; and the keyword search system which includes Boolean logic, but is easily learned by the average high school and junior high school student after one brief introduction. In the first quarter of the 1986-87 school year, nearly half the students in both the East Lyme junior and senior high schools (enrollments 550 and 1,150 respectively) were introduced to the Dow Jones News Service. At the high school, over 30 separate classes have used Dow Jones online data retrieval for courses in contemporary issues, sociology, psychology, modern American history, world history, business, Spanish, French, earth science, biology, physics, health, and literature. Individual students at both schools have also searched such databases as Movies, Sports, News, Encyclopedia, and

Peterson's College Search for personal information and recreational interests.

Minnich, Nancy P. and McCarthy, Carrol B. (1986, April). "The 'Clipping Thesis': An Exercise in Developing Critical Thinking and Online Database Searching Skills." *School Library Media Activities Monthly* 2 (8), 45-50.

The "Clipping Thesis" program described in this article was developed in 1985 at Tower Hill School, an independent school, as a spin-off of a pilot program to teach online searching skills that had been conducted the previous year. It was found that, although the database project had been successful in teaching students how to access large amounts of information from online databases, the students lacked the critical thinking skills they needed to help them evaluate the accuracy and worth of the information located. Designed as an exercise in critical thinking, the Clipping Thesis program originally used at the University of Delaware required freshman students in political science to purchase the daily *New York Times* and clip all of the articles on a particular topic over several months or a year, and then write a thesis based on the articles they had clipped. This program was modified at Tower Hill to be used as part of the ninth grade curriculum in history. The history department wanted students to do additional reading on current events outside of class, and one class period was made available for the library media specialist and the teacher to give instructions to the students. There were about 15 students in each class, and each student's topic for the current six week cycle was approved by the teacher; they had different topics for each of the four cycles. Within each cycle, the students had three weeks to clip articles and write summaries; one week to write a one-page initial summary with an annotated bibliography; and one week to write a final summary and bibliography. Four classes participated in the project. Students in the first class were given their own copies of the daily *New York Times*; students in the second class read the *Current New York Times on Microfiche*; students in the third class read articles from any of the current periodicals in the library; and the students in the fourth class went online with DIALOG to search Magazine Index and Newsearch Index, and current issues of *The New York Times* and *The Christian Science Monitor* were stored in the periodical room to pro-

vide access to the indexed articles. The four cycles rotated during the year to allow each class to go through each of the different types of assignments. It was found that the students were enthusiastic about the online searching, the different forms in which information was provided added variety and held the students' interest, and the quality of both the bibliographies and the writing improved with each cycle. One student wrote on his evaluation, "I can never go back to reading newspaper articles in the thoughtless way I once did." This brief article includes a list of the hardware and software used, a form for requesting an online search, a page for an online search log, and the "Clipping Thesis" instructions that were given to the students.

Pruitt, Ellen and Karen Dowling. (1985, March)."Searching for Current Information Online. How School Library Media Centers in Montgomery County, Maryland, Are Solving an Information Problem by Using DIALOG." *Online* 9 (2), 47-60.

This article describes the initiation of a successful online information service in 22 high schools in the Montgomery County Public School system. The DIALOG Information Utility was chosen for its wide range of databases and its discount for classroom instruction, as well as because the school staff was somewhat familiar with it. The goals of the program were to introduce the concept of online searching to students and to expand the realm of resources available to them. The program's objectives were to teach students to: identify parts of a database; create a new database; identify how access to a database is provided; identify topic descriptors; access online information; discriminate between subject databases; and select database characteristics. Statistics revealed increased student online use during the program's second year. Heaviest use was reported in the beginning months of each semester, early fall and spring, reflecting students' awareness of time factors inherent in the online process. ERIC and Magazine Index were accessed most often, followed by Biography Index and Current Affairs. Sample searches from Magazine Index, Newsearch, U.S. Political Science documents, and PAIS are provided, and the process of refining search strategies by expanding terms, choosing appropriate databases, and using subject headings is demonstrated. Pruitt and Dowling briefly describe how

the program met curriculum needs and identified problems with print resources. The authors predict that online information retrieval skills will continue to be incorporated into library skills programs, that media center funds will be reallocated for online searching, and that online databases will be used as ready reference tools.

Pruitt, Ellen and Dowling, Karen. (1987, May). "Searching with Students Online. . . How We Taught It and What We Learned!" *School Library Media Activities Monthly* 3 (9), 29-32.

A two week online seminar was offered after regular school hours in Montgomery County (MD) for secondary students who wanted to improve their information gathering skills and add a new dimension to their knowledge of computers. The seminar began by introducing the students to electronic bulletin boards, which are both free and user-friendly. The next step was a highly structured exercise using the print and online versions of Grolier's *Academic American Encyclopedia* on CompuServe, an online information service which provides access to information on a wide range of topics. Searching on DIALOG databases was the culminating activity. Students' reactions to the seminar were positive and enthusiastic, though some many felt that two weeks was not long enough, and several wanted the opportunity to explore other databases and bulletin boards. This brief article lists the search aids provided to the students and sources of information on bulletin board systems; provides instructions for "touring" CompuServe at no cost; describes two software programs that simulate online searching; and provides addresses for obtaining additional information on WILSEARCH (a software package that allows a search strategy to be prepared offline for searching online), the databases on CD-ROM developed by SilverPlatter Information Services, and the online services used in the student seminar (CompuServe and DIALOG).

Management of Online Information Services

Aversa, Elizabeth S. and Jacqueline C. Mancall. (1986). "Managing Online Information Services in School Library Media Centers." In Shirley L. Aaron and Pat R. Scales

(eds.), *School Library Media Annual, 1986*, vol. 4, pp. 219-236. Littleton, CO: Libraries Unlimited.

The management of online services is described as an ongoing process involving five major steps. *Step One* suggests establishing instructional and service goals, such as the following: to prepare students to become knowledgeable information seekers, to expand their perceptions of how to access their information environment, to assist them in refining their search process, to generate enthusiasm for independent information seeking, to cooperate with teachers in integrating online instruction with classroom activities, to expand teachers' and administrators' knowledge of the availability of electronic information, to provide documents on demand to meet subject needs, and to increase the local availability of useful documents. *Step Two* defines the necessity for developing new professional skills, including knowledge of how to search particular systems, understanding of existing databases, how to acquire documents referenced online (especially through interlibrary cooperation), how to manage the online service, and how to teach online searching to students. Guidelines and suggestions are given for developing these skill areas. *Steps Three and Four* point to the need for sound management of the online service and suggest procedures for developing budget and record-keeping instruments. Finally, *Step Five* describes simple evaluative measures based on easily collected data to assess the efficiency and effectiveness of the online service.

Casbon, Susan. (1983, November). "Online Searching with a Microcomputer—Getting Started." *Online* 7 (6), 42-46.

This overview for the beginner outlines the advantages and disadvantages of using a microcomputer to search in libraries, the legal implications of downloading, predictions of future trends, and considerations for selecting hardware and software. It is pointed out that microcomputers have library applications other than searching, such as word processing and circulation. Downloading provides easy editing, rapid electronic transmission, and saving capability. However, downloading is not legal in all databases and the paucity of legal precedents in this area leaves librarians to their own discretion in interpreting the "fair use intent of the copyright law" as it applies to this innovation. In choosing hardware and software, the author

recommends prioritizing the library uses for the microcomputer, evaluating communications software in terms of its compatibility to the micro, and examining printer controls. Operation of the communications package on the chosen microcomputer is also recommended before buying.

Colberg, Donald A. (1988). "CD-ROM: An Update on an Expanding Technology." In Jane Bandy Smith (ed.), *School Library Media Annual*, vol. 6, pp. 133-140. Englewood, CO: Libraries Unlimited.

This overview of CD-ROM technology briefly reviews indexes, bibliographic sources, and full-text reference works currently available on CD-ROM that would be of interest to school library media centers. Online public access catalogs on CD-ROM and hardware requirements are also briefly discussed, and ways to keep up with developments in the field are suggested. A directory of vendors and their products is provided.

Hand, Dorcas. (1988). "Online Searching: Educational Bargain." In Jane Bandy Smith (ed.), *School Library Media Annual 1988*, vol. 6, pp. 141-149. Englewood, CO: Libraries Unlimited.

This overview of online database search services provides information on services for the school library media center offered by the major online utilities: BRS (Instructor, Educator); CompuServe; Dialog Information Services, Inc. (Classroom Instruction Program, Classmate); Dow Jones News Retrieval; Einstein (Addison-Wesley Information Services Division—education only); The Source Telecomputing Company; and WILSONLINE. Information provided includes educational access (special programs); costs; documentation; number of databases available; educational support; and other levels of access. Issues that must be addressed in planning for online services are then discussed, including cost and budget considerations, ease of use and degree of training required, and numbers of databases available, security, time, and vendor support. These discussions include examples from the seven major online services described above. The subject areas covered by these online services are indicated in a comparative table.

Vandergrift, Kay E., Marlyn Kemper, Sandra Champion, and Jane Anne Hannigan. (1987, June/July). "CD-ROM: Perspectives on an Emerging Technology." *School Library Journal* 33(9), 27-31; (1987, August) "CD-ROM: An Emerging Technology: Part 2: Planning & Management Strategies." *School Library Journal* 33 (10), 22-25.

This two-part series examines the library applications of selected CD-ROM products and suggests management approaches for CD-ROM implementation. Part 1 describes mixed comments by users of Bowker's Books in Prints (BIP) Plus. These comments include the greater-than-anticipated use of BIP Plus in the public service area, though no direct student use was reported; the need for improved electronic transmission; and the advantages of speed, accuracy (especially in ordering processes), key word searching capability, and time saved. Some respondents were cautious in evaluating the new technology too soon. Book reviews from *School Library Journal*, *Library Journal*, *Publishers Weekly*, *Choice*, and *Booklist* will also be available soon on CD-ROM *Reviews Plus*.

Part 1 examines three CD-ROM products available for young people: Grolier's The Electronic Encyclopedia; Info-Trac II, a high-speed quick-print device combining three-year retrospective magazine coverage with current *New York Times* indexing; and GEOVISION, a geography subject application program with graphics capability. An extensive CD-ROM selected book list is included.

Part II of the series describes a planning approach to CD-ROM management. Guidelines to consider before embarking on this newest technology include: (1) establishment of a task force to evaluate the benefits of a CD-ROM investment; (2) conduct of a feasibility study to determine how the technology will affect existing library services; (3) creation of procedures and policy documents concerning project objectives and provisions for equipment, facility, and personnel expenditures; (4) evaluation of hardware and software features, machine compatibility, and cost; (5) analysis of contractual, licensing, and subscription agreements for documentation, training and service support, and use restrictions. A list of selected serials is included.

Appendix A. Selected Document Delivery Services

American Psychological Association (APA)
APA documents and publications:
APA Library
American Psychological Association
1400 North Uhle Street
Arlington, VA 22201
703-247-7747 or 800-336-4980

Non-APA publications and articles:
Contact individual publisher or
Information on Demand
8000 Westpark Drive
McLean, VA 22102
800-999-4463

Chemical Abstracts Service
American Chemical Society
Document Delivery Service
2540 Olentangy River Road
Columbus, OH 43210
614-447-3670 or 800-848-6538

ERIC (Educational Resources Information Center)
For ERIC documents (ED numbers):
ERIC Document Reproduction Service
3900 Wheeler Avenue
Alexandria, VA 22304-5110
800-227-3742

For journal articles (EJ numbers):
UMI Article Clearinghouse
300 North Zeeb Road
Ann Arbor, MI 48106
313-761-4700 or 800-732-0616
(from Michigan, Alaska, or Hawaii,
call collect 313-761-4700)
Note: Copies of articles are available

from UMI for about 65% of the journals indexed in CIJE.

Institute for Scientific Information
3501 Market Street
Philadelphia, PA 19104
800-523-1850

Sociological Abstracts Reproduction Service
P.O. Box 22206
San Diego, CA 92122
619-565-6603

UMI Article Clearinghouse
300 North Zeeb Road
Ann Arbor, MI 48106
313-761-4700 (Michigan, Alaska, and Hawaii call collect)
800-732-0616

Appendix B. Vendor Contacts for School Library Media Specialists

BRS (Bibliographic Retrieval Service)
Mary McMahon, Educational Services Coordinator
BRS Information Technologies
1200 Route 7
Latham, NY 12110
215-646-6897 or 800-345-4BRS

DIALOG
Anne S. Caputo, Program Manager
Classroom Instruction Program
DIALOG Information Services, Inc.
1901 North Moore Street, Suite 809
Arlington, VA 22209
703-553-8455

DOW JONES
Margaret Bakes
Dow Jones and Company
P.O. Box 300
Princeton, NJ 08543-0300
609-452-1511

WILSONLINE
Rhoda Garoogian, Manager
Training Documentation Staff
H. W. Wilson Company
950 University Avenue
Bronx, NY 10452
212-588-2266